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ONE HUNDRED NINTH CONGRESS

# Congress of the United States

## House of Representatives

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INDEPENDENT

## MEMORANDUM

To: Members of the Subcommittee on National Security, Emerging  
Threats, and International Relations

From: Christopher Shays   
Chairman

Date: February 23, 2006

Subject: Briefing memo for the February 28, 2006 Subcommittee hearing

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Attached find the briefing memo required by Committee rules for the hearing on Tuesday, February 28, 2006 entitled, *Progress Since 9/11: Protecting Public Health and Safety Against Terrorist Attacks*. The hearing will convene at 2:00 p.m. in room 2154 Rayburn House Office Building.

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February 23, 2006

## MEMORANDUM

To: Members of the Subcommittee on National Security,  
Emerging Threats, and International Relations

From: Kristine K. Fiorentino

Subject: Briefing Memorandum for the field hearing, *Progress Since 9/11: Protecting Public Health and Safety Against Terrorist Attacks* scheduled for Tuesday, February 28, 2006, at 2:00 p.m. in room 2154 Rayburn House Office Building.

## PURPOSE OF THE HEARING

The purpose of the hearing is to discuss surveillance, monitoring, diagnosis and treatment of illnesses related to the 9/11 attacks and assess public health and safety preparedness against future attacks.

## HEARING ISSUES

1. **How effective have programs been in addressing the public health impacts of September 11, 2001?**
2. **What are the lessons learned from the World Trade Center (WTC) health monitoring programs and what should be done to enhance preparedness?**

## BACKGROUND

The public health system has taken on a significant role in the War on Terrorism. The September 11, 2001 terrorist attacks caused both immediate and long term health effects. Future terrorist events will likely do the same. Due to the unknown nature of terrorism, the public health system must be prepared to handle several threats including biological, chemical, radiological, nuclear and mass trauma.

The collapse of the World Trade Center towers along with the fires burning at Ground Zero produced an excessive amount of dust and smoke. Various sizes of particulate matter floated in the air and blanketed the New York City streets. Fires burned under the debris until the middle of December 2001. A mixture of plastics, metals, and other chemicals and products burned or decomposed into very fine particles. The content of the plume varied centimeter by centimeter. Some researchers found one molecule that had never been found in the air before. **(Web Resource 1)**

According to Paul Lioy, of the Environmental and Occupation Health Sciences Institute of the University of Medicine in New Jersey, “Initial exposures were basically a blackout- exposures people will, cumulatively, never see in a lifetime again. The problem we have now is we don’t know the long-term, lifetime, health consequences. We just don’t know.” **(Web Resource 1)**

Four years after September 11, 2001 questions remain about the short and long term health effects of the attack on the World Trade Center. While

air monitoring results from various government agencies including the Environmental Protection Agency (EPA), the Occupational Safety and Health Administration (OSHA), and the National Institute for Occupational Safety and Health (NIOSH) found only a limited amount of samples with elevated levels of toxins, many workers, volunteers and fireman at the World Trade Center sites experienced respiratory symptoms while working at Ground Zero and continue to experience symptoms. <sup>1</sup> (**Web Resource 2, p. 3**)

### **World Trade Center Health Registry**

The New York City Department of Health and Mental Hygiene (DOHMH), the federal Agency for Toxic Substances and Disease Registry (ATSDR), and the Federal Emergency Management Agency (FEMA) have established the World Trade Center Health Registry to track the physical and mental health problems of people exposed to the fire and smoke caused by the destruction of the World Trade Center towers. (**Web Resource 3, p. 2**) The registry is open to up to 200,000 people who were living south of Canal Street on 9/11/01, students and staff at schools or day care centers south of Canal Street, workers involved in the rescue, recovery, or clean up at the WTC site or WTC recovery operations on Staten Island between 9/11/01 and 6/30/02, as well as those people who were in a building, on the street, or on the subway south of Chambers street on 9/11/01. (**Web Resource 4**)

More than 50,000 people have enrolled in the registry. (**Attachment 1, p. 1**) People who join the registry are interviewed about their exact location on September 11, 2001, their exposure to smoke and dust and any health problems suffered since. Registrants will be periodically contacted by the New York City DOHMH to monitor any changes in health. This information will be compared with the general population in order to identify any health problems linked to September 11, 2001. (**Attachment 2, p. 2**)

The registry was funded for fiscal year 2003 at a cost of \$20 million. The registry is planned to continue over 20 years in order to track changes in

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<sup>1</sup> Further information regarding air monitoring results can be found in a previous Subcommittee hearing briefing memorandum:  
<http://reform.house.gov/UploadedFiles/September%208%20Briefing%20Memo.pdf>

health over time. **(Attachment 2, pp. 3-4)** However, the source of funding to continue the program for the full 20 years remains unclear.

## **Health Screening**

The Mount Sinai-Irving J. Selikoff Center for Occupational and Environmental Medicine received \$12,000,000 in federal funding from NIOSH to establish the World Trade Center Worker and Volunteer Medical Screening Program.<sup>2</sup> The program was established to evaluate health problems and hazardous exposures experienced by worker and volunteer responders to the World Trade Center attack on September 11, 2001. Federal funding for the program will support a total of 9,000 medical screening examinations, of which 2,500 will be done at facilities other than Mount Sinai under the auspices of the Association of Occupational and Environmental Clinics (AOEC). Mount Sinai has provided more than 8,000 exams for workers and volunteers. More than 11,000 screening examinations have been done nationally. **(Attachment 3, p. 1)**

The New York Fire Department (FDNY) has a separate program to monitor the health of firefighters, EMTs, Paramedics and EMS officers who assisted in the rescue and recovery at the World Trade Center site. This program is known as the FDNY WTC Medical Monitoring Program. More than 11,000 medical examinations have been conducted. **(Web Resource 5)**

The Consolidated Appropriations Resolution, 2003, (House Conference Report 108-10) made an additional \$90,000,000 available for administering “baseline and follow-up screening and clinical examinations and long-term health monitoring and analysis for emergency services personnel and rescue and recovery personnel, of which not less than \$25,000,000 shall be made available for such services for current and retired firefighters.” **(Attachment 4, p. 2)** The funding was distributed through NIOSH in the form of eight grants to the New York City Fire Department (FDNY), the Mount Sinai Center for Occupational and Environmental Medicine and six other centers in and around New York City to establish a five-year health screening program for rescue workers. **(Attachment 5, p. 1)**

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<sup>2</sup> Public Law 107-117, January 10, 2002

## **Studies on 9/11 Health Effects**

Several studies have been done to look into the short term health effects of September 11, 2001. These short term health effects included respiratory and mental health problems. However further research must be done to look into possible long term health effects. Those who were at Ground Zero may experience delayed illnesses due to unique toxic exposures.

A study published in the September 12, 2002 issue of the New England Journal of Medicine by Dr. David J. Prezant, Deputy Chief Medical Officer of the New York City Fire Department (FDNY), Dr. Michael Weiden, Medical Officer for the FDNY and other researchers examined FDNY workers who were exposed to air pollutants after the collapse of the World Trade Center. Approximately 332 firefighters were examined who had developed severe cough after exposure. This severe cough was named “World Trade Center cough” and was defined as, “a persistent cough that developed after exposure to the site and was accompanied by respiratory symptoms severe enough to require medical leave for at least four weeks.” **(Attachment 6, p. 1)**

The results of the study showed in the first six months after September 11, 2001, World Trade Center cough occurred in 128 of 1636 firefighters with a high level of exposure (8 percent), 187 of 6958 with a moderate level of exposure (3 percent), and 17 of 1320 with a low level of exposure (1 percent). A high level of exposure occurred if the firefighters had arrived at the scene during the collapse of the World Trade Center, a moderate level of exposure occurred if the firefighter arrived after the collapse but within the first two days, a low level of exposure occurred if the firefighter had arrived between days 3 and 7, and no exposure occurred if the firefighter was not at the site during at least the first two weeks of the rescue operation. The likelihood of World Trade center cough was related to the magnitude of exposure. Other findings include 95 percent of FDNY workers had shortness of breath, 87 percent had gastroesophageal reflux disease, and 54 percent had nasal congestion. **(Attachment 6, p. 1)**

As of August 28, 2002, 358 firefighters and five EMS workers remained on medical leave or light duty assignment because of respiratory illness that occurred after WTC exposure. An estimated 500 FDNY

firefighters may qualify for disability retirement because of persistent respiratory conditions. **(Web Resource 6, pp. 4-5)**

The conclusion of this study was, “Intense, short term exposure to materials generated during the collapse of the World Trade Center was associated with bronchial responsiveness and the development of cough. Clinical and physiological severity was related to the intensity of the exposure.” **(Attachment 6, p. 1)** The study also found cough suppressants, antibiotics and inhaled corticosteroids to be effective treatments. **(Attachment 6, p. 3)**

An interim report by the Mount Sinai-Irving J. Selikoff Center for Occupational and Environmental Medicine, World Trade Center Worker and Volunteer Medical Screening Program summarized the data on a random sample of 250 of the first 500 patients from July 16-August 29, 2002. **(Attachment 3, p. 1)** Findings indicated half the sample had experienced persistent WTC-related pulmonary, ENT and/or mental health symptoms ten months to one year following the September 11 attacks. **(Web Resource 7, p. 1)** According to Dr. Levin, Co-Director for the program, “The findings also point to the need for treatment resources and for short-and long-term follow up. The earlier these WTC-related illnesses are detected and treated, the more likely the treatment will prevent long-term illness and disability.” **(Web Resource 7, p. 1-2)**

Likewise, findings from the World Trade Center Health Registry showed mental health and respiratory problems topped the list of health complaints by those who were in lower Manhattan on September 11, 2001. **(Attachment 1, p. 1)** A ground Zero study by researchers at Columbia University of 1,131 cleanup and recovery workers found 13% had post traumatic stress disorder (PTSD) symptoms compared with 5% not involved in recovery efforts, 9% had symptoms of major depression, compared with 1% of those not at Ground Zero, and 20% of cleanup worker had generalized anxiety disorder, compared with 5% of workers not at Ground Zero. **(Attachment 7, pp. 1-2)**

A study of residents living near the World Trade Center site found residents reported higher rates of new onset upper respiratory symptoms after 9/11, and that most of these symptoms persisted one year after 9/11. **(Attachment 8, p. 1)**

## **Improved Terrorism Response**

Several steps have been taken to improve overall terrorism response capabilities. The Department of Homeland Security (DHS) was created and is responsible for disseminating information regarding the risk of terrorist attacks to federal, state and local officials and to establish priorities for protecting those at risk. **(Web Resource 8, p. 9-10)**

On January, 6, 2005 the National Response Plan was promulgated to coordinate all federal domestic incident prevention, preparedness, response, and recovery plans. **(Web Resource 8, p. 16)** The National Response Plan is an, “all-discipline, all-hazards plan that establishes a comprehensive framework for the management of domestic incidents. It provides the structure and mechanisms for the coordination of Federal support to State, local, and tribal incident managers and for exercising direct federal authorities and responsibilities. NRP assists in the important homeland security mission of preventing terrorist attacks within the United States; reducing the vulnerability to all natural and man-made hazards; and minimizing the damage and assisting in the recovery from any type of incident that occurs.” **(Web Resource 9)**

Under the National Response Plan, The Department of Health and Human Service (HHS) will have the lead role in providing public health and medical services during disasters and emergencies. HHS will coordinate federal health and medical resources such as emergency response teams, the Centers for Disease Control and Prevention and the Strategic National Stockpile. **(Web Resource 10)**

DHS and the Department of Health and Human Services (HHS) have taken steps to increase detection, response, and recovery from biological and chemical terrorism. All 50 states have bioterrorism response plans in place. HHS staff responsible for public health emergency preparedness has increased from 212 in 2001 to 1,700. **(Web Resource 11, p. 2)**

Project Bioshield was created to accelerate research and development of countermeasures, to enable the FDA to provide treatments quickly during emergencies, and to permit the government to purchase countermeasures. The National Institute of Health’s (NIH) civilian biodefense research budget increased from \$100 million prior to September 11, 2001 to \$1.5 billion in 2003. **(Web Resource 8, p. 14)** The BioWatch program has provided



biological agent detectors in more than 30 cities. The Strategic National Stockpile was enlarged from eight to twelve, 50-ton packages drugs, vaccines, and medical supplies. This stockpile can deploy within 12 hours. HHS has contracted for new countermeasures for the stockpile such as the next-generation anthrax vaccine. **(Web Resource 8, p. 15)**

The U.S. government has provided \$7.9 billion in grants between 2002 and 2003 to state and local responders, public health agencies and emergency managers to prepare for terrorist attacks. **(Web Resource 8, p. 15)** The National Disaster Medical System has increased personnel for emergency response teams from 6,000 in 2001 to 8,000. **(Web Resource 11, p. 3)** The number of Urban Search and Rescue teams has increased from 6 to 28. **(Web Resource 8, p. 16)**

According to Dr. Julie Gerberding, Director, “CDC has made terrorism preparedness and emergency response one of two overarching agency goals and has built an infrastructure to catalyze and implement biodefense activities and collaborate with our Federal, state, and local government partners as well as with the private sector, non-governmental organizations, and tribal nations.” **(Web Resource 12, p. 1)**

The CDC has taken steps to strengthen laboratory capacity in responding to terrorism. The Interagency Consortium of Laboratory Networks (ICLN) was established to promote collaboration and communication among laboratory networks. **(Web Resource 12, p. 3)** Eleven new high-level biocontainment research laboratories have been funded by NIH and will be used for research purposes and to assist in the public health response to bioterrorism incidents. **(Web Resource 11, p. 2)**

After September 11, 2001 federal funding for state public health preparedness programs increased from \$67 million in fiscal year (FY) 2001 to \$1 billion in FY 2002. This funding has increased the number of epidemiologists. **(Web Resource 13, p.1)**

## **DISCUSSION OF HEARING ISSUES**

### **1. How effective have programs been in addressing the public health impacts of September 11, 2001?**

While programs have been created to monitor health and provide assistance to victims, there is concern the programs do not go far enough and do not provide treatment for the injured. Most programs are only funded for a short period of time, making it difficult to examine illnesses and cancers in the long term. Funding for treatment is lacking. Some of the workers at the World Trade Center site have lost their jobs due to serious respiratory health effects, and do not have health insurance. While some are receiving workers compensation due to their illnesses, they are concerned about the long term costs of their care. They are worried about their long term health and the ability to receive the treatment they need in the future. **(Attachment 9, pp. 1-3)**

The World Trade Center Health Registry was established to examine long-term health effects from September 11, 2001. However some question the usefulness of the registry and the commitment on the part of the government to keep it running since it will need future funding to keep it operating for the planned 20 years.

According to GAO, “none of these programs are funded to provide treatment, they provide varying options for treatment referral. Under current plans, HHS funding for the programs will not extend beyond 2009. Some long term health effects, such as lung cancer, may not appear until several decades after a person has been exposed to a harmful agent.” **(Web Resource 14, p. 1)**

There is also a significant amount of distrust among people who are experiencing health effects since September 11, 2001 because government agencies had pronounced the air quality to be safe due to air monitoring results. Officials at the FDNY have resisted efforts to hand over health data collection efforts to the government. Instead FDNY officials prefer to track and monitor the health of firefighters.

The HHS program to screen federal workers who were sent by their agencies to respond to the World Trade Center disaster was put on hold in January 2004. Only 394 of the estimated 10,000 federal workers who responded completed screening. Federal workers had been excluded from other monitoring programs because it was assumed they would be receiving screening through the HHS program. Since the program was put on hold, federal workers may have lost the opportunity to identify and seek treatment for their health concerns related to 9/11. Recently the program started again and has screened 133 federal workers since January 2006. However, it remains to be seen how many more screenings will be done and how long this program will continue. **(Web Resource 15)**

## **2. What are the lessons learned from the World Trade Center (WTC) health monitoring programs and what should be done to enhance preparedness?**

Recent testimony from the Government Accountability Office (GAO) found the lessons learned from the aftermath of 9/11 include the need to rapidly identify and contact people affected by a disaster, the importance of a centrally coordinated approach for assessing individual's health, the importance of monitoring both physical and mental health and the need to plan for providing referral for treatment when screening identifies health issues. **(Web Resource 15)**

The Department of Health and Human Services Agency for Toxic Substances and Disease Registry (ATSDR) has developed a questionnaire known as the Rapid Response Registry to enable officials to identify individuals affected by a disaster and collect their contact and location information immediately following an incident. The questionnaire is available as a model instrument to states or localities that request it. **(Attachment 10)** However, some are concerned this form is not official, and guidelines regarding the use of this form are lacking. Only 14 states have requested the questionnaire.

There are also concerns the government has not taken steps to address the health monitoring lessons learned from 9/11. The protocol for health monitoring after a terrorist event has not been established. Should a disaster occur in the future, the government will face the same challenges and difficulties in establishing and maintaining health monitoring programs.

Ms. Cynthia Bascetta, Director, Health Care, Government Accountability Office will provide an update on the health effects from the September 11<sup>th</sup> terrorist attacks and the programs in place to monitor these effects.

Mr. Ronaldo Vega, Architect with the NY City Department of Design and Construction (DDC) will testify about the health problems he has experienced since working on the rescue and recovery effort at Ground Zero.

Mr. Marvin Bethea, Paramedic, will talk about the health problems he has experienced since 9/11 and the difficulties he has encountered with his workers compensation claim.

Dr. Stephen M. Levin, Co-Director of the World Trade Center Worker and Volunteer Medical Screening Program will testify about health findings from the screening program.

Dr. John Howard, Director for the National Institute for Occupational Health (NIOSH), will testify about the status of federal surveillance, and monitoring programs related to the 9/11 attacks.

Dr. Kerry J. Kelly, New York City Fire Department (FDNY) Chief Medical Officer, will testify about the FDNY World Trade Center Medical Program.

## ATTACHMENT

1. Loretta Chao, "Health Department WTC Registry," *Newsday*, August 4, 2004.
2. Lynda Richardson, "A Public Health Warrior, Tracking 9/11 Trends," *The New York Times*, October 3, 2003.
3. World Trade Center Worker and Volunteer Medical Screening Program, Report of Initial Findings To the National Institute For Occupational Safety and Health of the Centers For Disease Control and Prevention, January 24, 2003.
4. House Report 108-10, Conference Report on Consolidated Appropriations for FY 2003 (P.L. 108-7).
5. FDNY Press Release entitled, "FDNY Awarded Multimillion Dollar Grant From NIOSH to Continue WTC Medical Monitoring," April 6, 2004.
6. David J. Prezant, M.D., et. al., "Cough and Bronchial Responsiveness in Firefighters at the World Trade Center Site," *The New England Journal of Medicine*, Vol. 347, No.11, September 12, 2002.
7. Marilyn Elias, "9/11 Still Haunts Pentagon Workers, WTC rescuers," *USA TODAY*, May 4, 2004.
8. Lin, Shao, "Upper Respiratory Symptoms and Other Health Effects among Residents Living Near the World Trade Center Site after September 11, 2001" *American Journal of Epidemiology* September 15, 2005.
9. Greg Sargent, "The City Politic Zero for Heroes," *New York Magazine* October 20, 2003.
10. Agency for Toxic Substances and Disease Registry (ATSDR) Rapid Response Registry Survey Form

## WEB RESOURCES

1. Laurie Garrett, "A Chemical Factory In Skies," *New York Newsday.com* September 11, 2003. <http://landofpuregold.com/truth138.htm>
2. Congressional Research Service, Report RL31261 entitled, "Federal Air Quality and Emergency Response Authorities At The World Trade Center Site," January 30, 2002. [www.crs.gov](http://www.crs.gov)
3. New York City Department of Health and Mental Hygiene Press Release regarding the World Trade Center Health Registry, September 23, 2003 <http://www.nyc.gov/html/doh/html/public/press03/pr130-0923.html>
4. World Trade Center Health Registry website <http://www.nyc.gov/html/doh/html/wtc/about.html>
5. FDNY website regarding WTC Medical Monitoring Program [http://www.nyc.gov/html/fdny/html/emp\\_resources/health\\_connections/index.shtml](http://www.nyc.gov/html/fdny/html/emp_resources/health_connections/index.shtml)
6. Morbidity and Mortality Weekly Report (MMWR) September 11, 2002/Vol. 51 <http://www.cdc.gov/mmwr/PDF/wk/mm51sp.pdf>
7. Mount Sinai Medical Center Press Release, January 27, 2003 - <http://www.wtcexams.org/pdf/pressrelease-20030127pdf.pdf>
8. The White House, "Progress Report on the Global War On Terrorism, September 2003." <http://www.whitehouse.gov/homeland/progress/index.html>
9. Department of Homeland Security website <http://www.dhs.gov/dhspublic/display?theme=15>
10. Association for Professionals in Infection Control and Epidemiology website article entitled, "US issues response plan for terrorism, disaster," [http://id\\_center.apic.org/apic/bt/bioprep/news/jan0705plan.html](http://id_center.apic.org/apic/bt/bioprep/news/jan0705plan.html)
11. HHS news release, April 28, 2004 <http://www.hhs.gov/news/press/2004pres/20040428.html>

12. Testimony of Dr. Julie Gerberding, Director of CDC before the Committee on Homeland Security, July 28, 2005.

<http://hsc.house.gov/files/TestimonyGerberding.pdf>

13. CDC *MMWR Weekly*, “Brief Report: Terrorism and Emergency Preparedness in State and Territorial Public Health Departments—United States, 2004,” May 13, 2005.

[www.cdc.gov/mmwr/preview/mmwrhtml/mm5418a3.htm](http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5418a3.htm) 15.

14. GAO Testimony before the Subcommittee on National Security, regarding “September 11 Health Effects in the Aftermath of the World Trade Center Attack,” GAO-04-1068T, September 8, 2004. [www.gao.gov](http://www.gao.gov)

15. GAO Testimony entitled, “September 11 Monitoring of World Trade Center Health Effects Has Progressed, but Not for Federal Responders,” GAO-05-1020T, September 10, 2005. [www.gao.gov](http://www.gao.gov)

Committee on Government Reform  
Subcommittee on National Security, Emerging Threats, and International Relations  
“Progress Since 9/11: Protecting Public Health and Safety Against Terrorist Attacks”  
(February 28, 2006)  
Witness List

PANEL ONE

**Ms. Cynthia Bascetta**

Director, Health Care  
Government Accountability Office

**Mr. Ronaldo Vega**

Architect

**Mr. Marvin Bethea**

NYC Paramedic

**Dr. Stephen M. Levin**

Co-Director of the World Trade Center Worker and Volunteer Medical Screening Program  
Medical Director of the Mount Sinai –Selikoff Center for Occupational and Environmental Medicine

**Dr. Kerry J. Kelly**

FDNY Chief Medical Officer, Bureau of Health Services  
Co-Director FDNY-WTC Medical Program FDNY

PANEL TWO

**Dr. John Howard**

Director  
National Institute for Occupational Health (NIOSH)  
Centers for Disease Control and Prevention (CDC)  
Department of Health and Human Services (HHS)



# **Attachment 1**

1 of 1 DOCUMENT

Copyright 2004 Newsday, Inc.

Newsday (New York)

August 4, 2004 Wednesday  
CITY EDITION

SECTION: NEWS; Pg. A15

LENGTH: 374 words

HEADLINE: HEALTH DEPARTMENT WTC REGISTRY;  
Respiratory, mental problems top 9;  
11 ailments

BYLINE: BY LORETTA CHAO. STAFF WRITER

BODY:

Mental health problems and respiratory ailments top the list of short-term effects on those who were in lower Manhattan on Sept. 11, 2001, according to a preliminary review of the Health Department's World Trade Center registry.

More than 50,000 people have enrolled so far in the registry, which will monitor the long-term impacts of exposure. The deadline for enrollment is Aug. 31.

The health department said an analysis of those enrolled show a broad spectrum of races, incomes and locations on Sept. 11.

Of nearly 45,000 who signed up as of July 2, 65 percent are white, 12 percent are black, 11 percent are Hispanic, and 7 percent are Asian. Seventy-three percent of the enrollees have had at least some college education, and 80 percent had a total household income of \$35,000 or more in 2002. Almost 2,000 children under the age of 18 also registered.

Sixty percent of the enrollees were in a building, on a street, or in transit south of Chambers Street, and 42 percent were involved in rescue, recovery or cleanup at the World Trade Center site. Other groups included residents and children who went to school in the downtown area.

While 77 percent are from New York State, all 50 states are represented in the registry.

"The information which the scientists and which all of us will gain will benefit each of us in our lifetimes," Health Commissioner Thomas Frieden said. "It will be of specific benefit to our children."

The \$20.5-million registry was created last year to monitor the long-term health effects of Sept. 11.

"People had varying exposures so we can look at health effects over a broad range," Kelly Henning, the director of epidemiology at the health department, said. She said that having a significant sample from all the different groups is crucial for research.

Although it got off to a rocky start in some communities, officials said they extended their reach to communities with non-English speaking residents such as Chinatown and were happy to see that enrollment in the registry has improved across the board.

The registry now offers interviews in more than 150 languages including Spanish, Mandarin and Cantonese. Those who are planning to enroll can call 866-NYC-WTCR before the deadline to schedule a 30-minute interview.

**LOAD-DATE:** August 4, 2004

# **Attachment 2**

The New York Times

October 3, 2003, Friday, Late Edition - Final

NAME: DR. POLLY THOMAS

SECTION: Section B; Page 2; Column 3; Metropolitan Desk

HEADLINE: PUBLIC LIVES;

A Public Health Warrior, Tracking 9/11 Trends

BYLINE: By LYNDA RICHARDSON

DR. POLLY THOMAS is leaning over her computer, reviewing a daily graphic chart of people signing up for the World Trade Center Health Registry. Dr. Thomas is an assistant commissioner for the New York City Department of Health and Mental Hygiene.

The new registry, one of the biggest public health investigations in history, falls under Dr. Thomas's aegis in the department's Bureau of Surveillance.

"To do this is a huge job," she says, sitting in a small, cramped office at 125 Worth Street, her desk covered with tidy stacks of documents.

The registry is an ambitious project to track down tens of thousands of people who were exposed to the fire and smoke of Sept. 11, 2001. Dr. Thomas says up to 200,000 people could enroll. The agency plans a media campaign with brochures, large posters and subway and PATH train advertisements.

"We have pretty broad recruitment, but we are intensely focused on people with the highest exposure," she says. "Our data will tell a clear story of how many

people have different types of health issues." So far, she says 12,900 people have signed up, and 6,000 have completed the 30-minute telephone surveys.

The Health Department can be tight-fisted with its information, particularly if it is deemed confidential, delicate, premature. It can drive a reporter mad. But Dr. Thomas speaks proudly of the agency. "There is a lot of earnest endeavor going on here," she says. It has often been her friendly voice on the other end of the telephone line with reporters, explaining the seemingly inexplicable.

Dr. Thomas has tracked human ailments and diseases, chiefly AIDS, since she arrived at the department in 1981. She was stationed in New York during her training as a medical epidemiologist at the Centers for Disease Control in Atlanta. She was like a detective, mapping the early, deadly pattern of AIDS. She decided to never leave. At the Health Department, she has monitored pediatric H.I.V. cases and perinatal transmission of H.I.V. and delved into the spate of anthrax cases two years ago. She was named assistant commissioner in November 2000.

CALL her a public health warrior. But Dr. Thomas, a tall, slender woman with an intense manner, is also somewhat shy and private. She refuses to give her age; sage advice taken from a grandmother who died at 103. "It's personal," says Dr. Thomas, the mother of three children, ages 21, 19 and 15.

In starting the registry, Dr. Thomas has been busy in the last several months with administrative details like developing the survey questionnaire, obtaining approval from the city and federal government, and brainstorming ways to get the message out to the public.

"It's sort of a relief that we have started and we are having a great response from New Yorkers," she says. "We're very pleased with the interviews going on."

Does she worry about her own health? She says no.

"We would come up out of the subway and have this burning plastic odor, and you wonder what was this burning plastic odor doing to you," she says. "I'm not actually churning my stomach, but I'll be quite happy to have the registry and for the Health Department to have the data and to be able to watch the health trends."

As she talks about the registry, Dr. Thomas becomes more at ease. She makes a point of repeating the registry's toll-free number, (866) NYC-WTCR, and the city's information line, 311.

One is keen to know why it took so long to get the registry going, and whether that delay will hurt the endeavor. Dr. Thomas seems to anticipate these questions. "I think it's fine," she says in an upbeat tone, smiling. She says the draft protocol for the registry was actually developed by December 2001, \$20 million in federal financing was obtained by July 2002, and government approvals came this last summer. "We're concerned about long-term health effects, and so it's certainly not too late to look at these."

Dr. Thomas tracks human health conditions. But it was her childhood fascination with insects and nature that led her to study biology at Yale, where she attended medical school. The daughter of commercial artists, she was raised in the coal-mining region of northeastern Pennsylvania. "I used to look at bugs in my backyard. There were so many different kinds, and they were beautiful."

She trained as a pediatrician, a decision influenced by her younger sister, who has Down syndrome. She completed her pediatric residency at the University of Rochester, and has a part-time practice in Summit, N.J. She is married to Rick Bell, the executive director of the New York chapter of the American Institute of Architects.

The registry will follow the health of people for 20 years. Will she still be around then? "I've spent 20 years on AIDS, and hopefully some young energetic person will come along and help nurture the registry."



# **Attachment 3**

**WORLD TRADE CENTER WORKER AND VOLUNTEER  
MEDICAL SCREENING PROGRAM**

**REPORT OF INITIAL FINDINGS TO THE  
NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH  
OF THE CENTERS FOR DISEASE CONTROL AND PREVENTION (NIOSH/CDC)**

**January 24, 2003**

**Robin Herbert, MD & Stephen Levin, MD  
Co-Directors**

**Mount Sinai-Irving J. Selikoff Center for Occupational and Environmental Medicine  
Department of Community and Preventive Medicine  
Mount Sinai School of Medicine  
New York, NY**

## **WORLD TRADE CENTER WORKER AND VOLUNTEER MEDICAL SCREENING PROGRAM**

### **SYMPTOMS, PHYSICAL EXAMINATION FINDINGS AND HAZARDOUS EXPOSURES EXPERIENCED BY AN INITIAL GROUP OF 250 PARTICIPANTS**

In order to assess the prevalence and severity of health problems and hazardous exposures experienced by workers and volunteers participating in the World Trade Center Worker and Volunteer Medical Screening Program, participants' medical charts were reviewed. This interim report summarizes data on a random sample of 250 of the first 500 patients examined under the auspices of the Program during the period July 16-August 29, 2002. This report presents preliminary descriptive statistics focusing on a limited number of symptoms and examination findings on this subset of examinees. No attempt has been made to establish case definitions or to use clinical diagnoses for this analysis. Additionally, we have not conducted statistical analyses controlling for factors such as smoking status, gender, or age, which will be done in future analyses. Therefore, these findings should be viewed as preliminary. As of January 23, 2003, a total of 3,513 individuals have been seen as a part of this Program. On-going analysis is being conducted on data collected from all participants in the Program.

#### **Program Background**

In the months following the September 11, 2001 attacks on the World Trade Center (WTC), there became a growing concern about injuries and illnesses related to the disaster sustained by the many thousands of individuals who worked or volunteered at or near "Ground Zero." Workers at or near the WTC site had potentially sustained exposures to: 1) a range of environmental toxins, including cement and glass dust, asbestos, fiberglass, respirable and larger particulate matter - much of it highly alkaline - as well as lead and other heavy metals, PCBs, dibenzofurans, volatile organic compounds and other products of combustion; 2) psychological trauma; and 3) physical hazards including fire, collapsing buildings, falling debris, noise and extremes of temperature. There was mounting evidence of a high prevalence of respiratory illnesses among New York City firefighters and among ironworkers who were at Ground Zero. At the same time, it became clear that there were numerous other groups who were at or near the site during and after the WTC disaster who were also suffering from a variety of WTC-related health problems.

The Mount Sinai-Irving J. Selikoff Center for Occupational and Environmental Medicine (COEM) of the Department of Community and Preventive Medicine of the Mount Sinai School of Medicine in New York City, with the support of the Centers for Disease Control and Prevention (CDC), established a comprehensive medical screening program in July 2002 to provide free medical assessments, diagnostic referrals and occupational health education for workers and volunteers exposed to hazards of the World Trade Center site and/or Staten Island landfill in New York City in the aftermath of September 11, 2001. The program, based at the Mount Sinai-Irving J. Selikoff Center for Occupational and Environmental Medicine, will examine approximately 9,000 workers, about 2,500 of whom will receive examinations at other facilities in the greater New York/New Jersey metropolitan area, and nationally, under the auspices of the Association of Occupational and Environmental Clinics (AOEC).

The goals of the Program are:

- To identify individuals who sustained exposures at or near "Ground Zero" of the WTC site during rescue and recovery activities.
- To provide clinical assessments for exposed individuals to identify those with persistent WTC-related medical conditions.
- To coordinate referral for follow-up clinical care for affected individuals.
- To educate individuals about their exposures and the associated risks to their health, and to advise them about available benefit and entitlement programs.
- To establish "baseline" clinical status for individuals exposed at or near "Ground Zero" for purposes of comparison with future clinical assessments for diseases with chronicity or longer latency.

Participants have been recruited through a series of outreach efforts directed mainly to unions and other organizations whose members performed the rescue, recovery and clean-up work. Program staff have worked with the building trades unions, workers from telecommunications, transportation, the New York City morgue and the public sector, as well as police and non-New York City firefighters to inform members about the availability of the medical screening examinations. Program staff also worked with volunteer organizations including Red Cross, Salvation Army, Cross Cultural Solutions and various church and religious groups.

Each medical screening examination includes:

- 1) Comprehensive self-administered and nurse-administered medical questionnaires
- 2) Physical examination by a physician
- 3) Pulmonary function tests (spirometry) with bronchodilator administration
- 4) Standard blood tests and urinalysis
- 5) Chest x-rays
- 6) Psychological screening questionnaires, with on-site referral to mental health professionals
- 7) Interviewer-administered exposure assessment questionnaires

Each examinee is sent a final letter describing the results of his/her examination and also receives a packet of occupational health information related to the screening program, WTC-related health effects, and benefit programs.

### **Eligibility criteria**

During the initial period, beginning July 16, 2002, workers were eligible to participate in the program if they:

- 1) Worked and/or volunteered within (a) the site perimeter bounded by Chambers Street, Broadway, Rector Street and the Hudson River, or (b) the Staten Island Landfill, or (c) barge loading piers, and;
- 2) Were present on-site for at least 24 hours between 9/11 and 9/14 inclusive, and with a minimum of a total of 10 days on-site in September, and;
- 3) Performed rescue, recovery, debris cleanup and related support services.

These criteria were revised effective August 15, 2002 to allow participation by workers present on-site for at least 24 hours between 9/11 and 9/14 inclusive, or with a minimum of a total of 80

hours on-site in September.

Federal employees, New York City Firefighters, and New York State employees are covered by other medical screening programs and therefore were not eligible for this program.

## **PRELIMINARY FINDINGS**

### **Sample demographics**

The 250 participants were predominantly male (96%) and Caucasian (69%), with a median age of 40 (range 24-63). The gender distribution of these initial 250 participants is significantly different than the entire group of eligible participants. To date, newer screening participants include a larger proportion of women (see Table 1).

The largest occupational groups represented among the 250 participants were telecommunications field technicians and police officers (60% of the total sample). However, many other occupations were represented, including construction, transportation, sanitation, park and emergency medical workers (see Table 2). Since this initial sample includes a large proportion of workers (e.g., telecommunications employees) who were working near but not directly on the rubble pile, these data may underestimate the prevalence of symptoms experienced by all program participants.

### **Exposures**

The majority of participants (76%) were working at the WTC site or the landfill either on September 11, 2001 or the following day. Twenty four percent were still working at the site/landfill at the time of the examination. The remaining 76%, whose site/landfill work ended before the examination, worked a median of 94 days (range 3-324 days), or about 3 full months, on site (Table 3). Among those present in lower Manhattan on September 11, 2001 at any time of day, half were directly in the cloud of dust created by the collapse of the WTC buildings and another 31% were exposed to significant amounts of dust (see Table 4).

### **Symptoms - mental health**

About half of the sample reported symptoms on a screening questionnaire consistent with diagnosable mental health problems and/or significant problems with psychosocial functioning such as problems with a spouse/partner, children, work, or social or home life. (See Appendix 1 for a list of questions used in mental health questionnaires.) About half of the sample (52%) was referred for further evaluation by a trained psychiatric provider based on their questionnaire responses and, in a few cases, due to a clinician's judgment. About 1 in 5 participants reported symptoms on the screening questionnaire consistent with posttraumatic stress disorder (PTSD) (22%). Nearly 2 in 5 (37%) reported symptoms of anxiety, insomnia and depression (using the General Health Questionnaire), which triggered further evaluation (see Table 5).

PTSD rates, as assessed more than 10 months after the WTC disaster by the PTSD Symptom Checklist (see Appendix 1), are comparable in prevalence to other recent studies of workers in

the vicinity of the World Trade Center after the attacks. Of 191 Federal employees working near the WTC site, 25% reported symptoms consistent with PTSD 8 weeks after September 11<sup>th</sup> (1). Six months after September 11<sup>th</sup>, PTSD symptom prevalence among 374 employees at the Borough of Manhattan Community College was 15% (2). In control groups in these studies, PTSD prevalence was much lower, 4% among Dallas Federal employees, and 8% among York College employees (in New York City but not near the WTC site). The high prevalence of PTSD among our participants more than 10 months after the WTC disaster is indicative of persistent serious mental health problems (see Table 5).

### **Symptoms – upper and lower respiratory**

A large proportion of the sample reported respiratory symptoms which first developed while working at the WTC site or landfill. Additional participants reported that symptoms which had existed before September 11, 2001, had worsened while working at the site/landfill. We considered a worker to have a WTC-related symptom if the symptom either first developed after exposure at the WTC or worsened following exposure at the WTC. At least one WTC-related pulmonary symptom was reported by 78% of the sample, and at least one WTC-related ear, nose or throat (ENT) symptom was reported by 88% of the sample. In addition, about half of the sample was still experiencing at least one pulmonary symptom (46%) or ENT symptom (52%) in the month before the screening examination. Respiratory symptoms which first developed while working at the WTC site or landfill included throat irritation (44%), dry cough (38%), blowing nose more often (35%), chest tightness (28%), head or sinus congestion (26%), and shortness of breath (25%) (see Table 6). (See Appendix 2 for a list of questions about upper and lower respiratory symptoms.)

### **Physical examination and pulmonary function test findings**

Nasal mucosal inflammation was observed in 49% of the sample and swollen nasal turbinates were observed in 36% (see Table 7). Pulmonary function tests (PFTs) demonstrated a high prevalence of respiratory abnormalities. Twenty five percent of the 250 examinees had restriction, obstruction or mixed abnormalities. This high prevalence is not likely to be due to smoking, since 58% of this sample had never smoked. The proportion of examinees with significant bronchodilator response was comparable among those with restriction only, obstruction only, and combined (mixed) abnormalities, about 1/3 of each of those groups (see Table 8).

### **Evidence of disease by questionnaire and by physical examination and pulmonary function test**

We expected to find that persons with ENT or pulmonary symptoms (WTC-related symptoms in the past month) would be more likely to show abnormal findings on physical examination. This expectation was confirmed in data shown in Appendix 3. Participants with ENT symptoms were significantly more likely to have abnormal nasal physical examination findings, and participants with pulmonary symptoms were significantly more likely to have a bronchodilator response (Table 4 in Appendix 3) and slightly (although not significantly) more abnormal pulmonary function test results (Table 5 in Appendix 3).

We did not expect all workers with WTC-related ENT or pulmonary symptoms in the previous

month to have abnormalities on physical exam. This can occur for several reason, including: 1) Symptoms can change over the course of a month, and participants with symptoms, for example, two weeks before the screening exam, may not have symptoms the day of the exam; 2) Not all individuals with symptoms will show evidence of abnormal results on these tests. More sensitive tests (i.e. methacholine challenge) can detect pulmonary abnormalities in people who are symptomatic but whose PFTs and bronchodilator response are normal.

What is most striking is that a large proportion of this sample showed evidence (either symptoms or abnormal test results) of respiratory disease more than 10 months after September 11, 2001. Seventy-three percent of the sample had either ENT symptoms or abnormal physical examination findings or both (Table 3 in Appendix 3). Similarly, 57% of the sample had either pulmonary symptoms or an abnormal pulmonary function test or both (Table 4 in Appendix 3).

#### **Diagnoses prior to participation in the screening program**

Despite the high rates of abnormalities detected in these examinations, only 38% of the sample had sought and received any medical care for WTC-related health problems before participating in the screening program and even fewer had received a diagnosis of an illness. Sinusitis and/or nasal inflammation were the conditions that had been most commonly diagnosed (see Tables 9 and 10).

#### **Lost work time and workers' compensation**

While 38% of the sample had previously received or were receiving medical care for WTC-related health problems at time of exam and 21% had missed workday(s) because of WTC-related health problem(s), and despite the high prevalence of symptoms and abnormal physical examination findings, only 8% of this group had filed for workers' compensation for a WTC-related injury or illness (see Table 10).

### **CONCLUSIONS**

The major findings of this preliminary analysis were that:

- Seventy-eight percent of the sample reported at least one WTC-related pulmonary symptom (first developed or worsened after exposure at the WTC site); 46% of the sample was still experiencing at least one pulmonary symptom in the month before the screening examination.
- Eighty-eight percent of the sample reported at least one WTC-related ear, nose or throat (ENT) symptom; 52% of the sample was still experiencing at least one ENT symptom in the month before the screening examination.
- Fifty-two percent of the sample reported mental health symptoms requiring further mental health evaluation and about 1 in 5 reported symptoms consistent with post-traumatic stress disorder (PTSD).

This preliminary analysis is consistent with earlier case reports that a high proportion of workers at the WTC site have been experiencing persistent WTC-related symptoms, particularly upper and lower respiratory and mental health symptoms. The high prevalence of upper respiratory symptoms is corroborated by a high prevalence of abnormalities observed upon physical

examination. Only about one-third of the participants had received any prior medical care for these symptoms and conditions, thus emphasizing the need for this screening program. Further follow-up of these workers is clearly indicated in order to monitor the chronicity and severity of these health problems and to assure that proper treatment is received.

## **REFERENCES**

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2. NIOSH. Evaluation of Physical and Mental Health Symptoms Following the World Trade Center (WTC) Disaster: Borough of Manhattan Community College and York College. HETA # 2002-0096. Cincinnati, OH: NIOSH, 2002.



# **Attachment 4**

108TH CONGRESS  
1st Session

HOUSE OF REPRESENTATIVES

REPORT  
108-10

MAKING FURTHER CONTINUING APPROPRIA-  
TIONS FOR THE FISCAL YEAR 2003, AND  
FOR OTHER PURPOSES

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CONFERENCE REPORT

TO ACCOMPANY

H.J. Res. 2



FEBRUARY 13 (legislative day, FEBRUARY 12), 2003.—Ordered to be printed

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WASHINGTON : 2003

84-817

political subdivisions for cost-shared mapping activities under section 1360(f)(2), to remain available until expended.

#### NATIONAL FLOOD INSURANCE FUND

##### (INCLUDING TRANSFER OF FUNDS)

For activities under the National Flood Insurance Act of 1968 ("Act") and the Flood Disaster Protection Act of 1973, as amended, not to exceed \$32,393,000 for salaries and expenses associated with flood mitigation and flood insurance operations, and not to exceed \$77,666,000 for flood mitigation, to remain available until September 30, 2004, including up to \$20,000,000 for expenses under section 1366 of the Act, which amount shall be available for transfer to the National Flood Mitigation Fund until September 30, 2004, and which amounts shall be derived from offsetting collections assessed and collected pursuant to 42 U.S.C. 4014, and shall be retained and used for necessary expenses under this heading: Provided, That beginning in fiscal year 2003 and thereafter, fees authorized in 42 U.S.C. 4014(a)(1)(B)(iii) shall be collected only if provided in advance in appropriations acts. In fiscal year 2003, no funds in excess of: (1) \$55,000,000 for operating expenses; (2) \$529,380,000 for agents' commissions and taxes; and (3) \$40,000,000 for interest on Treasury borrowings shall be available from the National Flood Insurance Fund without prior notice to the Committees on Appropriations.

#### NATIONAL FLOOD MITIGATION FUND

##### (INCLUDING TRANSFER OF FUNDS)

Notwithstanding sections 1366(b)(3)(B)-(C) and 1366(f) of the National Flood Insurance Act of 1968, as amended, \$20,000,000, to remain available until September 30, 2004, for activities designed to reduce the risk of flood damage to structures pursuant to such Act, of which \$20,000,000 shall be derived from the National Flood Insurance Fund.

#### ADMINISTRATIVE PROVISIONS

Notwithstanding any other provision of law, funds appropriated to the Federal Emergency Management Agency (FEMA) for disaster relief for the terrorist attacks of September 11, 2001, in Public Law 107-117, may be used to provide funds to the City of New York and the State of New York for costs associated with such attacks that are unreimbursable under the Stafford Act, including but not limited to the non-federal share of relevant programs: Provided, That of the amounts made available, \$90,000,000 shall be available upon enactment of this Act to administer baseline and follow-up screening and clinical examinations and long-term health monitoring and analysis for emergency services personnel and rescue and recovery personnel, of which not less than \$25,000,000 shall be made available for such services for current and retired firefighters.

Notwithstanding any other provision of law, including sections 403 and 407 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (43 U.S.C. 5170b and 42 U.S.C. 5173), the Federal Emergency Management Agency is directed to provide, from

## PUBLIC LAW 108-7—FEB. 20, 2003

117 STAT. 517

## NATIONAL FLOOD INSURANCE FUND

## (INCLUDING TRANSFER OF FUNDS)

For activities under the National Flood Insurance Act of 1968 ("Act") and the Flood Disaster Protection Act of 1973, as amended, not to exceed \$32,393,000 for salaries and expenses associated with flood mitigation and flood insurance operations, and not to exceed \$77,666,000 for flood mitigation, to remain available until September 30, 2004, including up to \$20,000,000 for expenses under section 1366 of the Act, which amount shall be available for transfer to the National Flood Mitigation Fund until September 30, 2004, and which amounts shall be derived from offsetting collections assessed and collected pursuant to 42 U.S.C. 4014, and shall be retained and used for necessary expenses under this heading: *Provided*, That beginning in fiscal year 2003 and thereafter, fees authorized in 42 U.S.C. 4014(a)(1)(B)(iii) shall be collected only if provided in advance in appropriations acts. In fiscal year 2003, no funds in excess of: (1) \$55,000,000 for operating expenses; (2) \$529,380,000 for agents' commissions and taxes; and (3) \$40,000,000 for interest on Treasury borrowings shall be available from the National Flood Insurance Fund without prior notice to the Committees on Appropriations.

42 USC 4014  
note.

## NATIONAL FLOOD MITIGATION FUND

## (INCLUDING TRANSFER OF FUNDS)

Notwithstanding sections 1366(b)(3)(B)–(C) and 1366(f) of the National Flood Insurance Act of 1968, as amended, \$20,000,000, to remain available until September 30, 2004, for activities designed to reduce the risk of flood damage to structures pursuant to such Act, of which \$20,000,000 shall be derived from the National Flood Insurance Fund.

## ADMINISTRATIVE PROVISIONS

Notwithstanding any other provision of law, funds appropriated to the Federal Emergency Management Agency (FEMA) for disaster relief for the terrorist attacks of September 11, 2001, in Public Law 107-117, may be used to provide funds to the City of New York and the State of New York for costs associated with such attacks that are unreimbursable under the Stafford Act, including but not limited to the non-Federal share of relevant programs: *Provided*, That of the amounts made available, \$90,000,000 shall be available upon enactment of this Act to administer baseline and follow-up screening and clinical examinations and long-term health monitoring and analysis for emergency services personnel and rescue and recovery personnel, of which not less than \$25,000,000 shall be made available for such services for current and retired firefighters.

Notwithstanding any other provision of law, including sections 403 and 407 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (43 U.S.C. 5170b and 42 U.S.C. 5173), the Federal Emergency Management Agency is directed to provide, from funds appropriated to the Federal Emergency Management Agency for disaster relief for the terrorist attacks of September 11, 2001, in Public Law 107-117, up to \$1,000,000,000 to establish a captive insurance company or other appropriate insurance mechanism for

# **Attachment 5**

## **FDNY Awarded Multimillion Dollar Grant from NIOSH to Continue WTC Medical Monitoring**

*Mount Sinai School of Medicine, Long Island Occupational and Environmental Health Center, NYU School of Medicine, CUNY Queens College, and University of Medicine and Dentistry of New Jersey's Robert Wood Johnson Medical School among grant recipients.*

Fire Commissioner Nicholas Scoppetta today was joined by Senator Hillary Rodham Clinton (D-NY) and Dr. Stephen Levin from the Mount Sinai Center for Occupational and Environmental Medicine to announce the award of \$81 million in grants from the Department of Health and Human Services (HHS) National Institute for Occupational Safety and Health (NIOSH). Dr. Michael Galvin, Director of Extramural Programs for NIOSH was on hand to make the presentation and union representatives from the various agencies were also in attendance.

The eight grants will fund a five-year health-screening program of rescue workers involved in the rescue and recovery efforts at the World Trade Center. Of the total grant amount, the Fire Department will receive \$25 million to monitor fire and EMS personnel. The other grant recipients for non-FDNY rescue workers include the Long Island Occupational and Environmental Health Center, the Mount Sinai Center for Occupational and Environmental Medicine at the Mount Sinai School of Medicine, the NYU School of Medicine, the City University of New York's Queens College and the University of Medicine and Dentistry of New Jersey's Robert Wood Johnson Medical School.

"The ability to screen the long-term health of individuals who participated in the rescue and recovery effort at the World Trade Center is critical. Without this grant and the support of Senator Clinton, we would not have financial resources for this undertaking," said Fire Commissioner Scoppetta. "Those individuals who selflessly dedicated themselves in the days and months after September 11th can rest assured that we will be able to identify any signs or symptoms that may indicate long-term illness as a result of their work."

"This is a tremendous step toward fulfilling our promise to the firefighters, emergency workers and volunteers who labored at Ground Zero," said Senator Clinton. "Emergency response workers and volunteers risked their own lives to help save others on September 11th. This is evidence that America has not forgotten and a true expression of our moral obligation to the people who took care of us, on that terrible day and in the days that followed".

"Our Screening Program has found high rates of persistent respiratory and psychological problems among the WTC responders, even among those examined in recent months," said Dr. Levin. "This underscores the importance of this long-term medical monitoring program for the 9/11 heroes: it will enable us to identify those men and women who have suffered persistent adverse health effects and the resources needed for their care. We're grateful for the successful efforts of Senator Clinton and to the New York legislative delegation to secure the funding that makes this program possible."

The funding will provide free, long-term medical monitoring of rescue workers who participated in the rescue and recovery work at the World Trade Center. The goal of the program is to identify any potential symptoms, injuries, or conditions that may indicate a long-term illness as a result of those operations. The Fire Department will provide in-house clinical evaluations to FDNY firefighters and EMS personnel including retired FDNY members. The remaining funding will go to the other grant recipients to monitor non-Fire Department personnel in a variety of locations throughout the metropolitan area.

HHS also awarded additional grants to the Fire Department and Mt. Sinai to develop and establish data centers that will coordinate between the various clinical sites performing the examinations. This information will help determine the ongoing needs and priorities of the health-screening program.



The agencies receiving funding from the grant will begin workgroup sessions this week and clinical evaluations will begin in the coming months.

Contact: Francis X. Gribbon / Virginia Lam (FDNY) (718) 999-2056

<http://www.nyc.gov/fdny>



# **Attachment 6**



## COUGH AND BRONCHIAL RESPONSIVENESS IN FIREFIGHTERS AT THE WORLD TRADE CENTER SITE

DAVID J. PREZANT, M.D., MICHAEL WEIDEN, M.D., GISELA I. BANAUCH, M.D., GEORGEANN MCGUINNESS, M.D., WILLIAM N. ROM, M.D., M.P.H., THOMAS K. ALDRICH, M.D., AND KERRY J. KELLY, M.D.

### ABSTRACT

**Background** Workers from the Fire Department of New York City were exposed to a variety of inhaled materials during and after the collapse of the World Trade Center. We evaluated clinical features in a series of 332 firefighters in whom severe cough developed after exposure and the prevalence and severity of bronchial hyperreactivity in firefighters without severe cough classified according to the level of exposure.

**Methods** "World Trade Center cough" was defined as a persistent cough that developed after exposure to the site and was accompanied by respiratory symptoms severe enough to require medical leave for at least four weeks. Evaluation of exposed firefighters included completion of a standard questionnaire, spirometry, airway-responsiveness testing, and chest imaging.

**Results** In the first six months after September 11, 2001, World Trade Center cough occurred in 128 of 1036 firefighters with a high level of exposure (8 percent), 187 of 6958 with a moderate level of exposure (3 percent), and 17 of 1320 with a low level of exposure (1 percent). In addition, 95 percent had symptoms of dyspnea, 87 percent had gastroesophageal reflux disease, and 54 percent had nasal congestion. Of those tested before treatment of World Trade Center cough, 63 percent of firefighters (149 of 237) had a response to a bronchodilator and 24 percent (9 of 37) had bronchial hyperreactivity. Chest radiographs were unchanged from precollapse findings in 319 of the 332 with World Trade Center cough. Among the cohort without severe cough, bronchial hyperreactivity was present in 77 firefighters with a high level of exposure (23 percent) and 26 with a moderate level of exposure (8 percent).

**Conclusions** Intense, short-term exposure to materials generated during the collapse of the World Trade Center was associated with bronchial responsiveness and the development of cough. Clinical and physiological severity was related to the intensity of exposure. (N Engl J Med 2002;347:806-15.)

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THE September 11, 2001, terrorist attack that resulted in the collapse of New York City's World Trade Center led to an intense, short-term exposure to inorganic dust products of pyrolysis, and other respirable materials. The Fire Department of New York City (FDNY) operated a continuous rescue and recovery effort at the site involving approximately 11,000 firefighters, who were exposed to such respiratory irritants,<sup>1</sup> which have been implicated in the development of airflow obstruction.<sup>2,3</sup> We identified conditions associated with airway obstruction—namely, severe, persistent cough ("World Trade Center cough") and airway reactivity—in exposed firefighters by assessing a case series of 332 firefighters with World Trade Center cough who required extensive medical leave as well as other firefighters who had been exposed but who did not require medical leave.

### METHODS

#### Study Subjects

The Bureau of Health Services of the FDNY designated firefighters as having a high level of exposure if they arrived at the scene during the collapse of the World Trade Center on the morning of September 11, 2001 (day 1), a moderate level of exposure if they arrived after the collapse but within the first two days, a low level of exposure if they arrived between days 3 and 7, and no exposure if they were not at the site during at least the first two weeks of the rescue operation. FDNY officers used FDNY dispatch records to classify personnel according to the level of exposure, but owing to the high rate of self-deployment to the scene, the final designation was based on a self-administered questionnaire devised by the Bureau of Health Services and, when possible, confirmatory interviews. Among 11,336 firefighters employed by the FDNY on September 11, 2001, 343 died at the World Trade Center and 10,116 of the 10,993 surviving firefighters were subsequently evaluated as part of the medical monitoring program. Figure 1 shows the exposure status of the 10,116 firefighters who were evaluated; World Trade Center cough was diagnosed in 332, and 102 of the 9784 firefighters evaluated who did not have this condition (1 percent) were tested for bronchial hyperreactivity. World Trade Center cough was defined as a persistent cough that developed in a firefighter after exposure to the site and that was accompanied by respiratory symptoms severe enough for FDNY physicians to place the worker on medical leave for at least four consecutive weeks.

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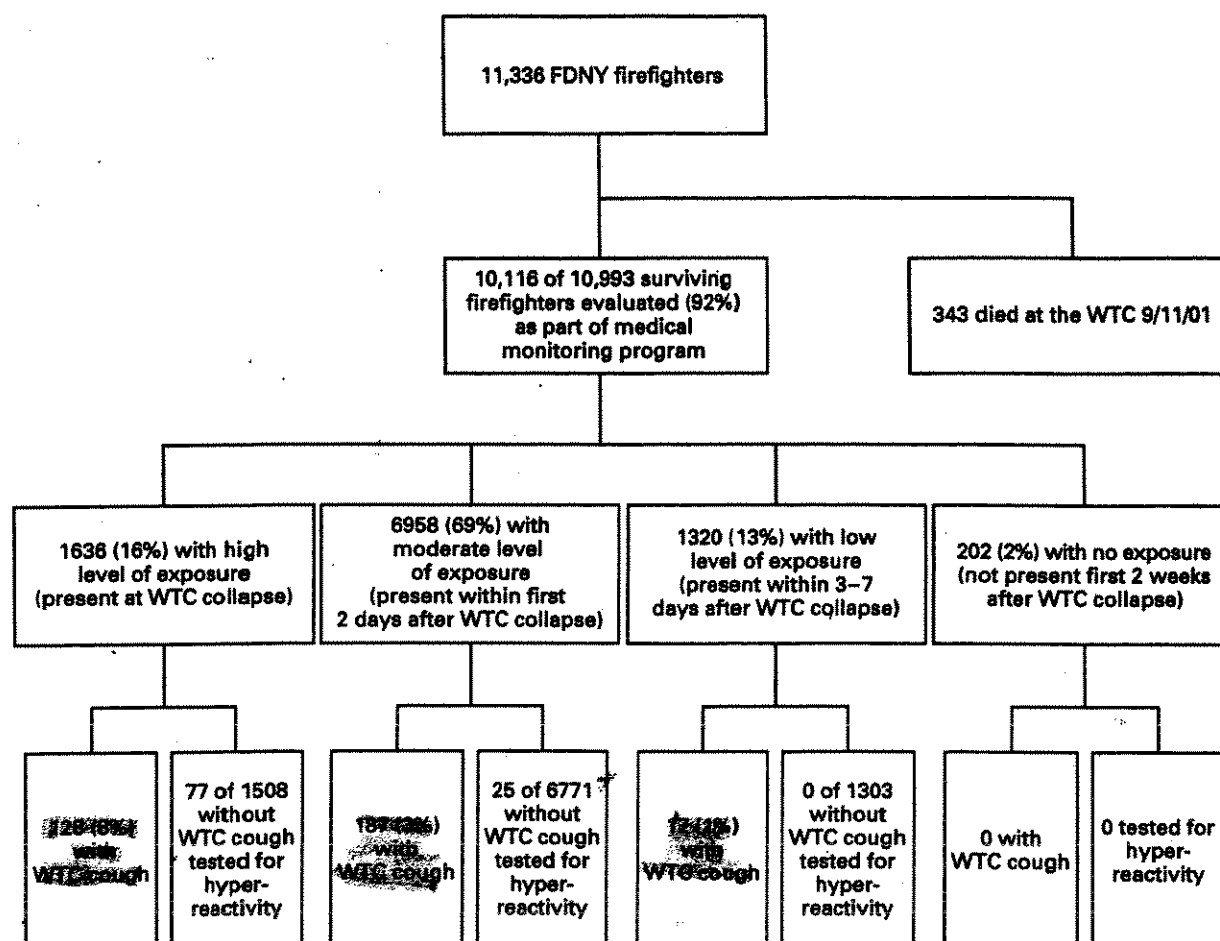


Figure 1. Number of Firefighters Employed by the Fire Department of New York City (FDNY) on September 11, 2001, and Number Who Were Subsequently Evaluated for World Trade Center (WTC) Cough and Bronchial Hyperreactivity, According to the Level of Exposure to Respiratory Irritants at the Site of the Collapse.

The study was approved by the research review board of the Montefiore Medical Center.

#### Bronchial Hyperreactivity in Exposed Firefighters without World Trade Center Cough

Approximately one month after the collapse of the World Trade Center (October 1 to 14, 2001), a sample of firefighters with moderate and high levels of exposure underwent a methacholine challenge to test for bronchial hyperreactivity. Among the 295 such workers who registered for the required medical evaluation during this interval, every second one was offered the opportunity to participate, regardless of the presence or absence of symptoms. All subjects remained on full duty, and the results of the challenge did not alter their duty status. All subjects gave written informed consent.

#### World Trade Center Cough in Exposed Firefighters

This report includes cases of World Trade Center cough identified from September 11, 2001, through March 11, 2002. Case ascertainment is complete, since all FDNY firefighters who are on

medical leave must report to the Bureau of Health Services for evaluation. Firefighters with World Trade Center cough either referred themselves for an evaluation of symptoms or were identified during the mandatory medical evaluation or on the basis of worker-compensation claims of injury or illness or applications to the FDNY for disability leave or retirement.

#### Diagnostic and Treatment Protocol

The standardized protocol (see Supplementary Appendix 1, available with the full text of this article at <http://www.nejm.org>) included an evaluation involving self-administration of the questionnaire, supplemented by history taking and a physical examination by a Bureau of Health Services physician. The questionnaire included queries about the time of arrival at the World Trade Center site, days spent at the site during the first two weeks, the type of respiratory protection worn (a dust mask, N95 respirator, or dual-cartridge half-face P-100 respirator), and the frequency of respirator use (never or rarely used vs. used most of the time) during the first two weeks after the collapse. Health-related questions were included about nasal and throat symptoms (nasal drip, nasal congestion,

and sore or hoarse throat), symptoms of gastroesophageal reflux disease (defined as heartburn, regurgitation, and retrosternal chest burning), and respiratory symptoms (defined as daily cough, nearly constant cough, wheeze, shortness of breath, chest tightness, and sleep disturbance due to respiratory symptoms). To be considered related to exposure to the World Trade Center site, symptoms had to be new or definitely worse since September 11, 2001.

A chest radiograph was obtained and spirometry was performed in all 332 firefighters with World Trade Center cough, and 237 also underwent postbronchodilator spirometry. Lung volumes and carbon monoxide diffusing capacity were measured in the first 81 firefighters with World Trade Center cough, and because the results were within normal limits in these subjects, they were performed in only 27 subjects thereafter at the discretion of a physician. A methacholine challenge was performed in 196 firefighters with World Trade Center cough. Noncontrast high-resolution computed tomographic (CT) imaging of the chest was performed at the discretion of their physician in 78 firefighters with World Trade Center cough who had normal chest radiographs. All firefighters with World Trade Center cough were included in the study data base, even if they did not undergo all tests.

Cough was treated with cough suppressants (containing codeine) as needed. In addition, subjects received inhaled (pulmonary or nasal) or oral corticosteroids, decongestants, antibiotics, leukotriene modifier (montelukast), or proton-pump inhibitors, depending on whether they presented with predominantly upper-airway or lower-airway findings (see Supplementary Appendix 1). In firefighters with World Trade Center cough, an upper-airway predominance was defined by nasal congestion or drip, gastroesophageal reflux disease, or both in the presence of normal findings on chest radiography and spirometry (a forced vital capacity [FVC] or forced expiratory volume in one second [FEV<sub>1</sub>] that was at least 80 percent of the predicted value) and the absence of treatment with an inhaled bronchodilator, an oral corticosteroid, or montelukast. A decongestant, a nasal corticosteroid, and an antibiotic were given for nasal congestion or drip, and a proton-pump inhibitor and dietary recommendations were given for gastroesophageal reflux disease. In firefighters with World Trade Center cough, a lower-airway predominance was defined by severe dyspnea, wheeze, or both in the presence of abnormal spirometric results (FVC or FEV<sub>1</sub> that was at least 15 percentage points lower than the value before exposure or less than 65 percent of the predicted value). Treatment included antibiotics, inhaled corticosteroids, bronchodilators, and in subjects with an inadequate therapeutic response, 10 mg of montelukast per day orally, with or without 40 mg of systemic prednisone per day (tapered over a period of one to two months).

#### Pulmonary Function and Airway Hyperreactivity

Before September 11, 2001, spirometry was performed every one to two years in all FDNY firefighters. After the collapse of the World Trade Center, spirometry was performed before treatment was initiated, and the results were compared with those of the most recent analysis (obtained within the preceding one to two years). Postbronchodilator spirometry was assessed 15 minutes after the inhalation of albuterol, and an increase in the FEV<sub>1</sub> by at least 12 percent and at least 200 ml was considered clinically significant.<sup>4-6</sup> Lung volumes and carbon monoxide diffusing capacity were determined with the use of helium-dilution and single-breath methods, respectively. Methacholine challenge testing was performed with the following exclusion criteria: an FEV<sub>1</sub> that was 65 percent of the predicted value or less, nonreproducible flow-volume loops, use of an inhaled or systemic corticosteroid within the preceding month, or current smoking (among those evaluated as part of the screening program). Increasing concentrations of aerosolized methacholine (Provocoline, Methapharm) were inhaled until the FEV<sub>1</sub> declined by 20 percent from the base-line value (PC<sub>20</sub>) or the maximal concentration was reached (25 mg of methacholine per milliliter). Bronchial hyperreactivity was defined as a PC<sub>20</sub> of 8 mg of

methacholine per milliliter or less.<sup>7-9</sup> Bronchial responsiveness was defined as a bronchodilator response or bronchial hyperreactivity (PC<sub>20</sub>  $\leq$  16 mg of methacholine per milliliter). All tests met the standards and guidelines of the American Thoracic Society,<sup>4,7</sup> and the results were calculated on the basis of predicted values.<sup>5,10</sup>

#### Radiographic Studies

In all subjects, posteroanterior chest radiographs were obtained and compared with base-line chest radiographs obtained before September 11, 2001 (usually within the preceding one to two years). A total of 78 firefighters with World Trade Center cough underwent high-resolution CT of the chest at full inspiration and end expiration. Sections that were 1 mm thick were obtained at 10-mm intervals and evaluated for airway and parenchymal abnormalities. The images were read independently by two readers who had no knowledge of the subjects' exposure status or clinical findings; differences of opinion were settled by consensus.

#### Statistical Analysis

Continuous variables are expressed as means  $\pm$  SD, and categorical variables are expressed as relative frequencies or percentages. Hyperreactivity was analyzed as a dichotomous variable at two cut-off points (PC<sub>20</sub> of 8 mg per milliliter or less or PC<sub>20</sub> of 16 mg per milliliter or less). Using analysis of variance, t-tests, or chi-square tests as appropriate, we compared the clinical characteristics among exposure groups and among subjects with World Trade Center cough according to prognostic subgroups: those with predominantly upper-airway symptoms (29 subjects) or lower-airway symptoms (95 subjects) or those with bronchial responsiveness (249 subjects). The lengths of medical leaves were compared with use of the Mann-Whitney U test. We used logistic regression to assess our outcome (resumption of firefighting duties) after adjustment for age, smoking status, and the presence or absence of airflow obstruction; results are expressed as odds ratios and 95 percent confidence intervals. A P value of less than 0.05 was considered to indicate statistical significance. All tests were two-tailed and performed with use of SPSS software.

## RESULTS

#### Airway Hyperreactivity in Exposed Firefighters without World Trade Center Cough

Between October 1 and 14, 2001, 391 firefighters underwent medical screening examinations and 295 met the criteria for exposure, 102 of whom underwent methacholine or bronchodilator challenge. Clinical characteristics (sex, age, smoking status, and presence or absence of respiratory symptoms) did not differ significantly either between the subjects who were eligible for testing and the subjects who actually were tested or among the subjects in the two highest exposure groups (data not shown). In this cohort of 295 firefighters, the average age was  $41 \pm 7$  years, the mean tenure at the FDNY was  $13 \pm 6$  years, and 13 percent were exsmokers. All reported cough within 24 hours after exposure, and none were on medical leave. The mean FVC and FEV<sub>1</sub> values were within normal limits in all groups. In the group of firefighters with a moderate level of exposure, the subjects who were eligible for testing had significantly higher FVC and FEV<sub>1</sub> values than did subjects who were actually tested (FVC, 96 percent vs. 89 percent of the predicted value;  $P=0.04$ ; and FEV<sub>1</sub>, 98 percent vs.

91 percent of the predicted value;  $P=0.003$ ). Among tested subjects there were no significant differences between the mean spirometric values obtained before the collapse of the World Trade Center and those obtained afterward (FEV<sub>1</sub>, 103 percent and 95 percent of the predicted value, respectively; FVC, 98 percent and 92 percent of the predicted value). Among the four exposure groups, there were no significant differences in respirator use during the first week (fewer than 22 percent reported frequent use).

Bronchial hyperreactivity (defined by a PC<sub>20</sub> of 8 mg of methacholine per milliliter or less) was present in 23 percent of firefighters with a high level of exposure (77 subjects) and 8 percent of those with a moderate level of exposure (26 subjects). Because age, smoking status, and the presence or absence of airflow obstruction may influence hyperreactivity, logistic regression was used to evaluate the association between the extent of exposure and the likelihood of hyperreactivity after adjustment for these variables. Spirometric values obtained after September 11, 2001, were used to adjust for the presence or absence of airflow obstruction. There was a significant association between the level of exposure and bronchial hyperreactivity: firefighters with a high level of exposure were more likely to have hyperreactivity than were those with a moderate level of exposure (relative risk, 21.0; 95 percent confidence interval, 1.8 to 164;  $P=0.01$ ). The addition of variables related to the use of respirators had no significant effect on the results.

#### Firefighters with World Trade Center Cough

All 332 firefighters who met the case definition for World Trade Center cough were men (99 percent of the FDNY workforce is male); the mean age in this group was  $43 \pm 7$  years, and they had worked for the FDNY for a mean of  $15 \pm 7$  years. Twenty percent were exsmokers, and 3 percent were current smokers. All had acute cough at the time of exposure; the frequencies of other symptoms are listed in Table 1.

#### Sample Case Report

A healthy 45-year-old deputy chief who had never smoked arrived at the World Trade Center shortly after the second jetliner's impact. He supervised medical triage directly in front of the south tower when it collapsed. He was buried under falling debris, from which he was able to extricate himself. He reported that the air was "darker than a sealed vault and thicker than pea soup" and that he had gagging and a productive cough leading to near syncope. For two months, he had a dry cough, sore throat, nasal congestion, chest discomfort, exertional dyspnea, and nocturnal symptoms (cough, tightness of the chest, and regurgitation) — predominantly lower-airway symptoms. His cough resolved within six weeks after treatment

TABLE 1. INCIDENCE OF UPPER- AND LOWER-AIRWAY SYMPTOMS BEFORE AND AFTER THE COLLAPSE OF THE WORLD TRADE CENTER (WTC) AMONG FIREFIGHTERS WITH WTC COUGH, ACCORDING TO THE LEVEL OF EXPOSURE TO RESPIRATORY IRRITANTS AT THE SITE.\*

VARIABLE	HIGH LEVEL OF EXPOSURE (N=128)	MODERATE LEVEL OF EXPOSURE (N=187)	LOW LEVEL OF EXPOSURE (N=17)
	percent		
Cough			
Before collapse	2	2	0
After collapse	100	100	100
Upper-airway symptoms			
Nasal congestion			
Before collapse	NA	NA	NA
After collapse	51	56	47
Nasal drip			
Before collapse	NA	NA	NA
After collapse	39	42	33
Sore throat			
Before collapse	0	1	0
After collapse	82	74	80
Gastroesophageal reflux disease†			
Before collapse	4	4	18
After collapse	88	86	82
Lower-airway symptoms			
Dyspnea			
Before collapse	2	2	6
After collapse	94	96	94
Wheeze			
Before collapse	2	2	6
After collapse	57	66	77
Chest discomfort			
Before collapse	1	0	6
After collapse	86	85	82
Nocturnal symptoms‡			
Before collapse	1	1	0
After collapse	68	59	67

\*To be classified as occurring after the collapse of the World Trade Center, a symptom had to be either new or more severe since September 11, 2001. Levels of exposure are defined in Figure 1. NA denotes not available.

†The symptoms of gastroesophageal reflux disease were heartburn, regurgitation, and retrosternal chest burning.

‡Nocturnal symptoms were disturbances in sleep that were due to cough, wheeze, or shortness of breath.

with a cough suppressant, antibiotic, and inhaled corticosteroids.

#### Clinical Characteristics

Within 24 hours after exposure, all 332 firefighters with World Trade Center cough reported having a productive cough; the sputum was usually black to grayish and infiltrated with "pebbles or particles." The likelihood of World Trade Center cough was significantly related to the magnitude of exposure ( $P<0.01$ ): World Trade Center cough developed in 8 percent of those with a high level of exposure (128 of 1636), in 3 percent of those with a moderate level of exposure (187 of 6958), in 1 percent of those with a low level

of exposure (17 of 1320), and in none of the firefighters with no exposure (0 of 202). Most cases occurred in firefighters with a high or moderate level of exposure (Fig. 1). Firefighters with World Trade Center cough began to seek medical attention in late September 2001. The peak incidence was in late October and early November, and by four months after the collapse of the World Trade Center, few new cases

were reported (Fig. 2). The number of firefighters on medical leave was minimal in September, probably as a result of the continuing intense efforts at the World Trade Center site, but the low rate may also reflect firefighters' relatively high thresholds for reporting respiratory symptoms.

By the time of evaluation, the cough had become nonproductive in 58 percent of the firefighters. Ex-

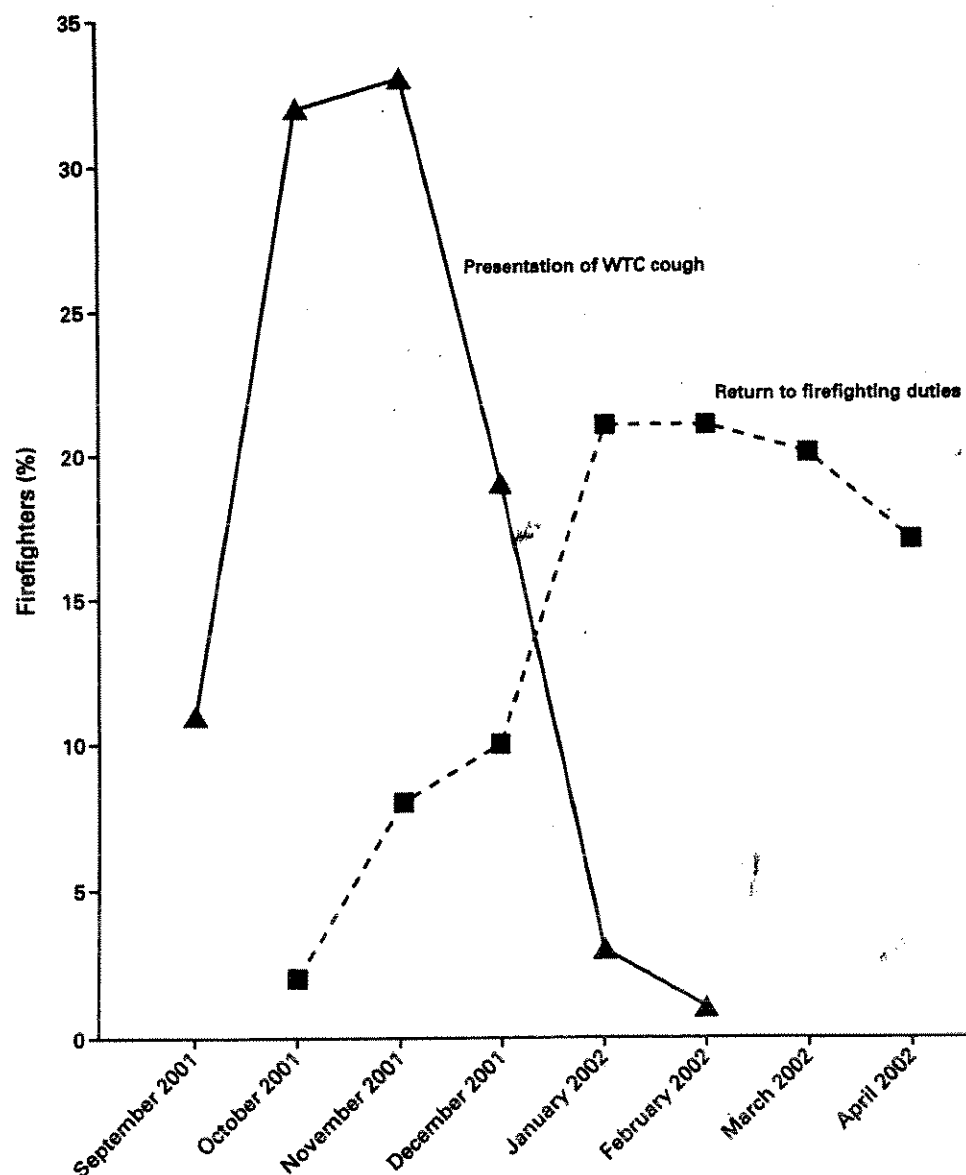


Figure 2. Clinical Course of World Trade Center (WTC) Cough.

World Trade Center cough was defined as a persistent cough that developed in the first six months after the collapse and required a medical leave from firefighting duties for at least four consecutive weeks. Return to firefighting duties (expressed as a percentage of all returning firefighters) required clearance by a Fire Department of New York City physician.

ertional dyspnea occurred in 95 percent. Upper-airway symptoms, including nasal congestion, nasal drip, and sore throat, were reported by up to 82 percent (Table 1). Overall, 87 percent had new or worsening symptoms of gastroesophageal reflux disease, which were judged by most to be severe (Table 1). The incidence of symptoms was not significantly different among the four exposure groups.

The use of respiratory protection was not associated with a significantly decreased risk of lower-airway symptoms, decreased pulmonary function, or airway hyperreactivity. However, respirators were worn rarely or not at all by 93 percent of firefighters on the day of the collapse, by 85 percent on the day after the collapse, and by 76 percent on the second through sixth days after the collapse. Even when respirators were used, the most common type was a simple paper dust mask rather than a fitted respirator certified by the National Institute of Occupational Safety and Health (self-contained breathing apparatus, N95, or dual-cartridge half-face P-100 respirator). By week 2, 65 percent of firefighters with World Trade Center cough reported frequent use of respirators, and 71 percent of those who so did used P-100 respirators.

### Lung Function

Spirometric values obtained before and after the collapse of the World Trade Center are shown in Table 2. FVC and FEV<sub>1</sub> values were less than 65 percent of the predicted values in 1 percent of firefighters before the collapse of the World Trade Center and in 12 percent and 14 percent, respectively, after the collapse. There were significant declines in FVC ( $P<0.01$ ), FEV<sub>1</sub> ( $P<0.01$ ), and the maximal forced expiratory flow between expired volumes of 25 percent and 75 percent of vital capacity ( $P<0.01$ ). The magnitude of the reductions in FVC and FEV<sub>1</sub> was nearly equal, with declines of at least 0.5 liter in 58 percent and 54 percent of firefighters, respectively. There were no significant differences in spirometric values or the magnitude of declines among the four exposure groups, but the declines tended to be least in the group with the lowest level of exposure.

Lung volumes and carbon monoxide diffusing capacity were within normal limits in 108 firefighters with World Trade Center cough who were tested. There were no significant differences in values between firefighters with abnormal findings on chest radiography and those with normal findings. Sixty-two per-

TABLE 2. SPIROMETRIC VALUES IN FIREFIGHTERS WITH WORLD TRADE CENTER (WTC) COUGH, ACCORDING TO THE LEVEL OF EXPOSURE TO RESPIRATORY IRRITANTS AT THE SITE.\*

VARIABLE	BEFORE COLLAPSE OF WTC†		AFTER COLLAPSE OF WTC		AGE-ADJUSTED DECREASE LITERS
	LITERS	% OF PREDICTED	LITERS	% OF PREDICTED	
	mean ±SD (range)				
FVC					
High level of exposure	4.64±0.82	92±11 (70-120)	4.11±0.92‡	81±15 (45-108)‡	-0.62±0.78
Moderate level of exposure	4.86±0.93	95±15 (45-143)	4.25±0.80‡	83±15 (41-126)‡	-0.73±0.76
Low level of exposure	4.92±0.54	98±9 (83-107)	4.19±0.57‡	83±10 (72-105)‡	-0.40±0.59
FEV <sub>1</sub>					
High level of exposure	3.95±0.71	95±13 (72-126)	3.43±0.75‡	82±16 (35-110)‡	-0.56±0.70
Moderate level of exposure	4.05±0.76	96±14 (46-143)	3.48±0.71‡	83±16 (39-128)‡	-0.64±0.69
Low level of exposure	4.08±0.52	99±12 (80-114)	3.46±0.47‡	84±11 (68-103)‡	-0.37±0.43
FEV <sub>1</sub> :FVC					
High level of exposure	0.85±0.05		0.83±0.08		
Moderate level of exposure	0.84±0.06		0.82±0.08		
Low level of exposure	0.83±0.05		0.83±0.07		
FEF <sub>25-75%</sub>					
High level of exposure	3.96±0.93	88±17 (62-120)	3.27±1.17§	77±17 (19-107)	
Moderate level of exposure	3.88±0.94	87±17 (42-121)	3.22±0.94‡	74±15 (30-103)‡	
Low level of exposure	3.47±0.57	81±15 (66-108)	3.05±0.83	73±18 (39-95)	

\*Levels of exposure are defined in Figure 1. FVC denotes forced vital capacity, FEV<sub>1</sub> forced expiratory volume in one second, and FEF<sub>25-75%</sub> the maximal forced expiratory flow between expired volumes of 25 and 75 percent of the vital capacity.

†Values were obtained one to two years before the collapse of the World Trade Center.

‡ $P<0.01$  by analysis of variance for the comparison with the value obtained before the collapse of the World Trade Center.

§ $P=0.03$  by analysis of variance for the comparison with the value obtained before the collapse of the World Trade Center.

cent of the firefighters who were tested (154 of 249) had evidence of bronchial responsiveness; 53 of 332 (16 percent) had a ratio of FEV<sub>1</sub> to FVC of less than 0.75, 149 of 237 (63 percent) had reversible abnormalities on postbronchodilator spirometry, and 47 of 196 (24 percent) had airway hyperreactivity (defined by a PC<sub>20</sub> of 16 mg of methacholine per milliliter or less) on challenge testing. Among 37 firefighters who were assessed before antiinflammatory treatment was begun, 24 percent had a PC<sub>20</sub> of 8 mg of methacholine per milliliter or less and 35 percent had a PC<sub>20</sub> of 16 mg per milliliter or less.

#### Chest Imaging

The findings on chest radiography were unchanged from base line in 319 of the 332 firefighters with World Trade Center cough (96 percent). Thirteen had lobar consolidation that resolved after antibiotic therapy. Of the 78 subjects with normal findings on chest radiography who underwent high-resolution computed tomography during inspiration and expiration (Table 3), 22 (28 percent) had no abnormalities. Air trapping was seen in 40 of the 78 (51 percent), and 12 of these patients (30 percent) had bronchial-wall thickening (Fig. 3). Seven of 38 subjects without air trapping (18 percent) had bronchial-wall thick-

ening. Isolated parenchymal findings or parenchymal findings in combination with airway abnormalities were identified in 8 of 78 subjects (10 percent).

#### Outcomes

Within seven months after the collapse of the World Trade Center, 48 percent of the firefighters with World Trade Center cough had returned to active duty. The resumption of firefighting duties was our primary outcome, because it required medical clearance by the FDNY pulmonologist, including confirmation that pulmonary function was normal without hyperreactivity in those with prior evidence of hyperreactivity. Ninety-three percent of those with predominantly upper-airway symptoms (27 of 29) resumed firefighting duties, as compared with only 34 percent of those with predominantly lower-airway symptoms (32 of 95). Sixty-five percent of those without bronchial responsiveness (62 of 95) resumed their duties, as compared with only 20 percent of subjects with bronchial responsiveness (31 of 154). Logistic regression showed that firefighters with predominantly upper-airway symptoms were more likely to return to full duty within this six-month period than were firefighters with predominantly lower-airway symptoms (relative risk, 22.0; 95 percent confidence interval, 1.5 to 327;  $P=0.03$ ). Firefighters without bronchial responsiveness were more likely to return to full duty than were firefighters with bronchial responsiveness (relative risk, 4.8; 95 percent confidence interval, 2.5 to 9.2;  $P<0.001$ ).

#### DISCUSSION

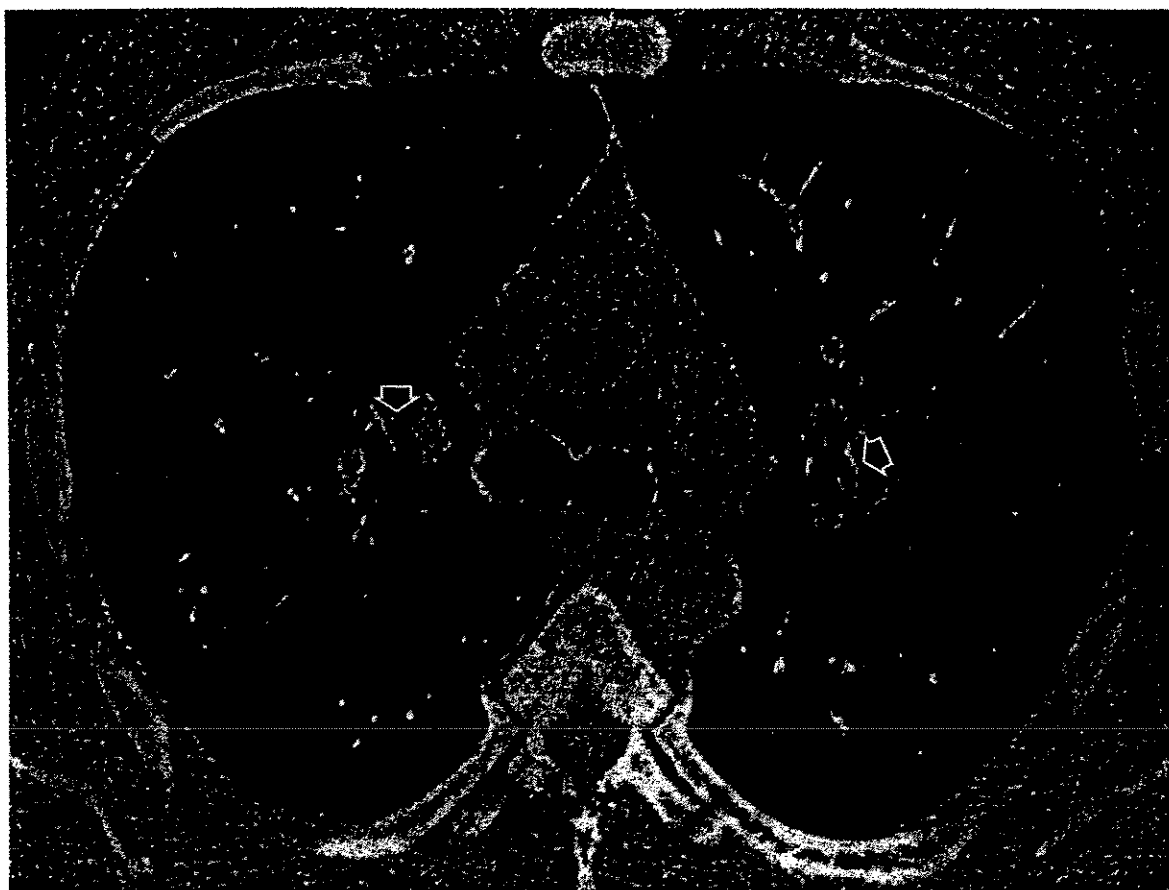
In the first days after the collapse of the World Trade Center, firefighters and other rescue workers were exposed to enormous but unmeasured amounts of dust and other particulate materials of various sizes. The Centers for Disease Control and Prevention concluded from an evaluation of environmental data that the level of exposure to most substances (asbestos, silica, heavy metals, volatile organic compounds, and polyaromatic hydrocarbons) did not exceed limits set by the National Institute of Occupational Safety and Health or the Occupational Safety and Health Administration,<sup>1</sup> with concentrations of airborne and respirable particulates ranging up to 2.3 and 0.3 mg per cubic meter, respectively.<sup>1</sup> Fractionation of airborne dust samples revealed that 0.4 to 2 percent of particulates were respirable (that is, less than 10  $\mu$ m in aerodynamic diameter; many were less than 2.5  $\mu$ m) and alkaline at a pH of no more than 12 (Chen LC: personal communication). However, most samples were obtained after September 17, 2001,<sup>1</sup> when substantial settling of dust had already occurred. The clinical and physiological findings in patients with World Trade Center cough and the airway-responsiveness findings

TABLE 3. FINDINGS ON HIGH-RESOLUTION CT OF THE CHEST IN FIREFIGHTERS WITH WORLD TRADE CENTER COUGH, ACCORDING TO THE PRESENCE OR ABSENCE OF AIR TRAPPING.\*

FINDING	ALL SUBJECTS (N=78)	Air TRAPPING (N=40)	No Air TRAPPING (N=38)
		no. (%)	
Bronchial-wall thickening	19	12 (30)	7 (18)
Bronchitis with inflammation of large and small airways	1	1 (2)	0
Parenchymal disease	8		
Ground-glass attenuation	5	4 (10)	1 (3)
Ground-glass attenuation and bronchial-wall thickening	1	1 (2)	0
Ground-glass attenuation and nodules	1	1 (2)	0
Ill-defined nodules and bronchial-wall thickening	1	0	1 (3)

\*Images obtained during full inspiration were evaluated for bronchial-wall thickening, which was subjectively identified by comparison with known bronchial anatomy; bronchiectasis (bronchus with an internal diameter that exceeded the internal diameter of the adjacent pulmonary artery); bronchiolar impaction (clustered centrilobular nodules in a characteristic tree-in-bud pattern); mosaic attenuation; ground-glass opacities (hazy increased lung density not associated with obscured underlying vessels); nodules; consolidation; and emphysema. Images obtained during end expiration were compared with those obtained during full inspiration to identify air trapping, defined by regions of lung that did not have an increase in attenuation and a decrease in volume with expiration.





**Figure 3.** High-Resolution CT Images Obtained in a Firefighter with World Trade Center Cough.

A 1-mm-thick collimated section obtained at the level of the carina in a 40-year-old male firefighter shows thickening of the walls of the bronchi to the upper lobes, which is most pronounced on the left (arrows).

in the cohort of firefighters who were exposed but in whom the cough did not develop demonstrate that there was clinically significant respiratory exposure.

World Trade Center cough occurred in 3 percent of the workforce and in 8 percent of those present during the actual collapse. The majority had dyspnea, chest discomfort, gastroesophageal reflux disease, and upper-airway symptoms. Although this cohort had reductions in FVC and FEV<sub>1</sub> that were similar in magnitude, with no change from the FEV<sub>1</sub>:FVC ratio determined before exposure, the findings in these subjects were predominantly attributable to airway abnormalities. Physiologically, there was a bronchodilator response and hyperreactivity; radiographically, there was air trapping and thickening of the bronchial wall without evidence of parenchymal changes.

The time of arrival at the World Trade Center site provided an effective means to categorize the intensity of exposure to respiratory irritants. It was predictive

of the prevalence of airway hyperreactivity and the incidence of World Trade Center cough.

Our study is one of the few that describe the incidence of bronchial hyperreactivity after short-term exposure to respiratory irritants. Hyperreactivity occurs in miners and construction workers, but only years after long-term low-level exposure to airborne particulates.<sup>11-13</sup> Bronchial hyperreactivity may occur within hours after smoke inhalation.<sup>14-16</sup> We found hyperreactivity in about a quarter of the firefighters with high levels of exposure, whether or not they had World Trade Center cough.

Our finding of sinusitis, bronchial hyperreactivity, and bronchial responsiveness in firefighters with World Trade Center cough is important but not surprising.<sup>17-20</sup> An unexpected finding was that 87 percent of such firefighters reported symptoms of gastroesophageal reflux disease; such symptoms are generally reported by less than 25 percent of patients with chron-



ic cough.<sup>1,21,22</sup> Despite the strong associations between gastroesophageal reflux disease and chronic cough<sup>17-20</sup> and between gastroesophageal reflux disease and asthma,<sup>23-25</sup> it remains unclear whether gastroesophageal reflux disease causes either condition.<sup>26</sup> The causative mechanism may be repeated aspiration of minute amounts of refluxed material; vagally mediated esophageal, tracheobronchial, or laryngobronchial cough reflexes; or neurally mediated bronchial inflammation.<sup>23,24,26</sup> Involvement of the posterior nasopharynx is common in patients with gastroesophageal reflux disease,<sup>27</sup> whereas bronchial hyperreactivity may not be present.<sup>25,26</sup> For these reasons, we classified gastroesophageal reflux disease as an upper-airway symptom (Fig. 2).

In the firefighters who reported inhaling and swallowing dust at the site, new or worsening gastroesophageal reflux disease may have resulted from dust-induced irritation of the gastroesophageal tract. Stress related to the terrorist attack and diet are also potential causes, but neither prescription medications nor over-the-counter formulations were responsible, since the symptoms were present before treatment for gastroesophageal reflux disease was initiated.<sup>26</sup> Gastroesophageal reflux disease may have triggered the respiratory symptoms or may have facilitated the persistence of the airway irritation or inflammation; we believe the latter possibility is more plausible.

The firefighters with World Trade Center cough had a similar magnitude of declines in FVC and FEV<sub>1</sub>. Similar patterns have been reported in workers exposed to inorganic particulates such as asbestos<sup>28,29</sup> and in brick workers,<sup>2</sup> whereas those exposed to toxic gas may have reduced FEV<sub>1</sub>:FVC ratios, as was the case among victims of the industrial explosion in Bhopal, India.<sup>30</sup> Despite the normal FEV<sub>1</sub>:FVC ratios in our subjects, airway obstruction was the predominant physiological abnormality. Radiographic or physiological evidence of parenchymal lung disease was uncommon, but high-resolution CT did provide evidence of air trapping. Air trapping could be due to asthma, bronchitis, emphysema, or bronchiolitis.<sup>31,32</sup> Bronchiolitis obliterans is a consequence of injury caused by the inhalation of a toxic substance and is characterized by either a classic pattern of obstruction or reductions in FVC and FEV<sub>1</sub> of a similar magnitude.<sup>3</sup> Since lung biopsy was not performed, we cannot exclude this diagnosis, but patients with bronchiolitis obliterans usually have no response to bronchodilators.<sup>3</sup>

Reactive airways dysfunction syndrome occurs after a brief, intense exposure to dust, fumes, or vapors in patients with no prior history of respiratory disease.<sup>33-35</sup> It is characterized by persistent symptoms of airway inflammation (cough, wheeze, and dyspnea) and bronchial hyperreactivity. In our study, the absence of respiratory symptoms or disease before

September 11, 2001, was confirmed by a review of medical records. In patients with reactive airways dysfunction syndrome, respiratory symptoms and hyperreactivity persist for at least six months.<sup>33-35</sup> Our empirical therapy was directed at reducing inflammation through the use of nasal or inhaled corticosteroids and proton-pump inhibitors. Although this treatment was not formally tested, the circumstances did not allow us time to devise a formal treatment trial. Whether symptoms and hyperreactivity in firefighters who worked at the World Trade Center site will prove persistent, resulting in reactive airways dysfunction syndrome or airway remodeling, requires long-term study.<sup>36,37</sup>

Will airway hyperreactivity, obstruction, or World Trade Center cough occur in other workers and residents exposed to the byproducts of the collapse of the World Trade Center? Despite anecdotal reports of similar findings in the population at risk, our findings may overestimate the risk of this disease, because overall, FDNY firefighters most likely had the highest level of exposure. Support for this conclusion is provided by the finding that airway hyperreactivity and World Trade Center cough were more common in the firefighters with a high level of exposure. Alternatively, our findings may underestimate the risk of this disease in the population at risk, because of the healthy-worker effect. Respiratory disease (including asthma) is a medical exclusion criterion for the job of an FDNY firefighter, and frequent medical monitoring identifies firefighters with respiratory impairment and thus prevents them from performing fire-suppression duties.

The rescue and recovery efforts of firefighters at the World Trade Center site resulted in the exposure of a large cohort of workers to respirable particles and vapors. Our findings indicate that the risk of airway hyperreactivity and World Trade Center cough was associated with the intensity of exposure. During the first six months after September 11, 2001, 3 to 8 percent of firefighters with moderate to high levels of exposure had cough severe enough to require medical leave; these workers also had clinical and physiological changes consistent with the presence of upper- or lower-airway dysfunction (or both). Even firefighters without severe cough had physiological abnormalities: airway hyperreactivity was present in 8 percent of those with a moderate level of exposure and 23 percent of those with a high level of exposure. Therefore, participants in rescue and recovery work in such settings need to be aware of the health risks involved.

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Award and is a scholar in the Clinical Research Training Program at Albert Einstein College of Medicine (K30-NIH).

This article is dedicated to the memory of those who are lost but not forgotten. We thank the many who guided us to safety and who have helped with the recovery.

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# **Attachment 7**



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## 9/11 still haunts Pentagon workers, WTC rescuers

By Marilyn Elias, USA TODAY

A sizable minority of Pentagon workers and Ground Zero cleanup crew still have post-traumatic stress disorder (PTSD) and depression symptoms after the Sept. 11 terrorist attacks, and many are not getting treatment, suggest reports out Monday.

Workers who were injured at the Pentagon and those who saw the injured or dead are in the worst shape, according to an online study two years after the attacks.

"For the most part, people fared quite well, but some really need help and they're not getting it," says psychiatrist Thomas Grieger of the Uniformed Services University of the Health Sciences in Bethesda, Md. He and co-author Douglas Waldrep reported on their Pentagon study at the American Psychiatric Association meeting in New York.

The survey, filled out anonymously by 267 workers, checked for PTSD and depression symptoms. About half of the employees were civilians, ranging from secretaries to executives; most from the military were officers.

Among major findings:

- 22% who were at work Sept. 11 have symptoms of PTSD, compared with 6% who weren't there.
- 47% of the injured have PTSD symptoms, compared with 10% who were unhurt.
- Overall, 13% report PTSD; about two out of five are receiving treatment.

The fact that 22% who were at the Pentagon when it was attacked still have PTSD symptoms such as flashbacks and anxiety doesn't surprise Charles Figley, a traumatic-stress expert at Florida State University. There's evidence that trauma involving deliberate violence is particularly likely to trigger PTSD.

For some at the Pentagon, seeking help "may imply weakness, that the terrorists have won," Figley says. Stigma and confidentiality concerns also might stop workers from getting help, Waldrep says.

Many are stoical, Grieger says. "It's an experience they lived through, and they think it's an experience that they're just going to have to live with."

The attacks killed 189 at the Pentagon and 2,749 at the World Trade Center.

In the Ground Zero study, 1,131 cleanup and recovery workers filled out mail surveys sent by researchers at Columbia University. These workers had worse mental health than co-workers who weren't at Ground Zero, study leader Raz Gross says:

- 13% had PTSD symptoms, compared with 5% not involved in recovery efforts.

•9% showed symptoms of major depression, compared with 1% of those not at Ground Zero.

•20% of cleanup workers had generalized anxiety disorder, a state of extremely high anxiety; 5% of workers not at Ground Zero had these symptoms.

There's good reason to believe that workers haunted by 9/11 would benefit from treatment, says Harvard psychologist Richard McNally, senior author of a recently published research summary on PTSD therapy. The best proven treatment is cognitive behavior therapy, which carefully guides survivors in the imagined reliving of a traumatic event and teaches ways to overcome anxiety, he says. Most evidence that this therapy works comes from studies on civilians who had trauma symptoms for six years or more.

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# **Attachment 8**



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## ORIGINAL CONTRIBUTIONS

### Upper Respiratory Symptoms and Other Health Effects among Residents Living Near the World Trade Center Site after September 11, 2001

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The authors investigated changes in respiratory health after September 11, 2001 ("9/11") among residents of the area near the World Trade Center (WTC) site in New York City as compared with residents of a control area. In 2002, self-administered questionnaires requesting information on the presence and persistence of respiratory symptoms, unplanned medical visits, and medication use were sent to 9,200 households (22.3% responded) within 1.5 km of the WTC site (affected area) and approximately 1,000 residences (23.3% responded) in Upper Manhattan, more than 9 km from the site (control area). Residents of the affected area reported higher rates of new-onset upper respiratory symptoms after 9/11 (cumulative incidence ratio = 2.22, 95% confidence interval (CI): 1.88, 2.63). Most of these symptoms persisted 1 year after 9/11 in the affected area. Previously healthy residents of the affected area had more respiratory-related unplanned medical visits (prevalence ratio = 1.73, 95% CI: 1.13, 2.64) and more new medication use (prevalence ratio = 2.89, 95% CI: 1.75, 4.76) after 9/11. Greater impacts on respiratory functional limitations were also found in the affected area. Although bias may have contributed to these increases, other analyses of WTC-related pollutants support their biologic plausibility. Further analyses are needed to examine whether these increases were related to environmental exposures and to monitor long-term health effects.

asthma; environmental pollution; New York City; respiratory tract diseases; terrorism

Abbreviations: CI, confidence interval; CIR, cumulative incidence ratio; WTC, World Trade Center.

**Editor's note:** An invited commentary on this article appears on page 508, and the authors' response appears on page 511.

The destruction of the World Trade Center (WTC) on September 11, 2001 ("9/11") resulted in the release of large amounts of pollutants into the surrounding areas. These

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pollutants included particulate matter, asbestos, metals, and organic compounds (1). Initially, smoke and debris came from the fires that erupted when the planes struck the buildings, followed by the release of airborne dust and debris from the collapse of the buildings. Subsequently, the fires that burned at the site for several months and clean-up activities released particulates. In many cases, dust from the collapse infiltrated homes and apartments at a depth of up to several inches (2). As people returned to their residences, settled dust was redispersed into the air.

One of the immediate public health concerns was the effect of this intensive exposure to these air pollutants on the health of local residents. Analyses of settled dust samples collected 5–6 days after the disaster indicated that 1–4 percent by weight were particles that can be inhaled deeply into the lungs (3) and are associated with respiratory diseases. Adverse health effects could have arisen from both acute high-level exposures and prolonged low-level exposures. Moreover, it is unknown whether the adverse respiratory effects, if they existed, were transient or persistent. Studies of asthmatic Lower Manhattan residents found worse symptoms and increases in medical care utilization and asthma medication prescriptions after 9/11 (4, 5). To our knowledge, these studies of persons with asthma are the only published studies of the respiratory health of residents near the site of the former WTC ("Ground Zero"). The pollution from the WTC disaster may have also caused new disease among previously healthy residents of New York City. Additionally, local residents complained about upper respiratory and other symptoms consistent with exposure to irritants. Since there are large residential communities around Ground Zero, the potential for respiratory health effects from exposure to these agents deserves investigation.

The goals of the present study included 1) determining whether there was an increase in the incidence of new-onset and persistent upper and lower respiratory symptoms in residents living near Ground Zero as compared with residents of a control area and 2) investigating whether there was an increase in symptom exacerbation among asthmatic residents living near Ground Zero as compared with a control area. Additionally, subgroups of residents with new-onset persistent symptoms and asymptomatic persons were identified and followed for assessment of chronic respiratory health effects, including symptom persistence and physiologic abnormalities as measured by spirometry. In this paper, we discuss the results pertaining to upper respiratory symptoms.

## MATERIALS AND METHODS

### Study design and study population

This retrospective cohort study was started 8 months after 9/11 (May 2002). The cumulative incidence of reported new-onset and persistent new-onset upper respiratory tract symptoms and unplanned medical visits/medication use among residents living near Ground Zero (the affected area) was compared with the incidence in a control population. Potential study buildings were selected so as to include major population areas below Canal Street in Lower Manhattan. These buildings were then stratified by housing character-

istics (e.g., low- or high-income rentals, cooperatives or condominiums, public housing complexes) and selected to include a range of these characteristics. Finally, 2000 US Census data were examined to ensure that the final study buildings were representative of the range of socioeconomic characteristics present in the underlying population of Lower Manhattan.

The area defined as the affected area is located within 1.5 km of the former WTC site and includes 49 buildings in Lower Manhattan with approximately 9,200 households. A control area was used for comparison, because the health histories of residents living near the WTC prior to 9/11 were not available and respiratory diseases usually have a strong seasonal component. The prevailing wind direction was considered in selecting the control area. Therefore, areas south, east, and west of the WTC that were impacted by the plume, including Brooklyn, New Jersey, and Staten Island, were excluded from the control area. Efforts were made to identify control buildings in census blocks with similar characteristics as the affected area. The control area consisted of approximately 1,000 households in five Upper Manhattan apartment buildings more than 9 km from the WTC site. To obtain a large, representative sample in the affected area, we oversampled the population of the affected area at a 9:1 ratio (affected area:control area). Figure 1 shows the study areas and the prevailing wind directions at John F. Kennedy International Airport for September 11–30, 2001.

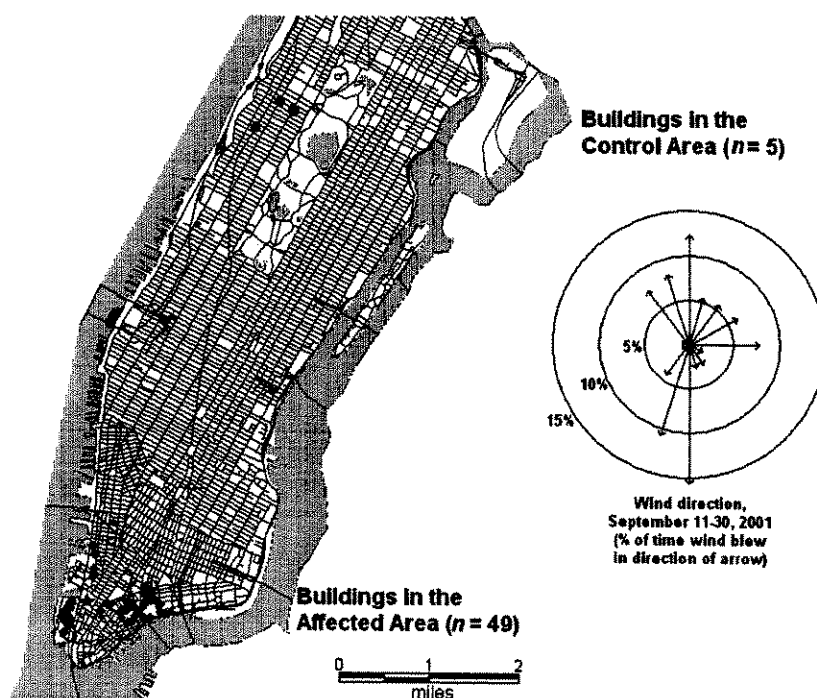
All residents of the identified affected and control buildings were eligible to participate in the study. Up to four residents in each household were asked to complete the questionnaire. To eliminate confounding effects due to residential mobility and to minimize potential misclassification due to occupational exposure, we excluded persons meeting any of the following criteria: 1) born after 9/11; 2) temporarily moved out of the residence after 9/11 and returned on or after January 1, 2002; 3) did not reside at the current address on 9/11; or 4) lived in the control area but worked in the affected area.

### Study materials and procedures

A study packet containing a cover letter, consent forms, questionnaires, and a stamped, addressed envelope was mailed to all apartments in the study buildings. The study packets also contained information about Project Liberty (a federally sponsored program providing free crisis counseling services to those affected by the WTC disaster) for persons who experienced anxiety while reviewing the materials. To accommodate the needs of the large populations of non-English speakers in the study areas, translations of the study materials were available for Spanish- and Chinese-speaking residents.

The questionnaires included a household questionnaire and four individual questionnaires. An adult resident was asked to complete the household questionnaire by providing information on the age, gender, and asthma status of all household members. The household questionnaire also asked about the condition of the apartment immediately after 9/11, the duration and frequency of odors or dust in the apartment, and any cleaning, sampling, or inspections that were performed.





**FIGURE 1.** Locations of study buildings in the affected and control areas, World Trade Center Health Survey, New York City, 2002. (1 mile = 1.61 km).

In households with more than four persons, two adult residents and the two oldest residents under age 18 years were asked to complete the individual questionnaire. For children younger than age 12, a parent or legal guardian completed the questionnaire. The individual questionnaire was primarily designed to estimate the prevalence and incidence of asthma and respiratory symptoms. This questionnaire was derived from the International Union Against Tuberculosis and Lung Diseases questionnaire and the International Study of Asthma and Allergies in Childhood questionnaire, both of which have been validated and used in epidemiologic studies to detect symptoms associated with asthma and bronchial hyperresponsiveness (6–9).

For questions about upper and lower respiratory symptoms and irritation symptoms, the resident was asked whether the problem had occurred in the past 12 months, whether it started after 9/11, whether it worsened after 9/11, and, depending on the type of symptom, either the average frequency or the perceived severity of the symptom during the past 4 weeks. Additional questions assessed unplanned medical visits (outpatient visits, emergency department visits, and hospitalizations), physician diagnoses of asthma and other respiratory disorders, use of asthma medication, and respiratory functional status. The questionnaire also included questions related to sociodemographic factors, smoking history, temporary residence changes after 9/11, and employment location. After receipt of a completed questionnaire, a Metro Card with a value of \$6 was mailed to the participant to acknowledge participation.

The study packets were initially distributed 1 year after 9/11 ( $\pm 4$  months) via bulk mail. Because of inconsistencies in the handling of this material, additional deliveries were made to each residence by hand. Where access could not be gained to make hand deliveries, the packets were left in building lobbies. Finally, in addition to the bulk mailing, a first-class mailing of the packets was made to all households, followed by a reminder postcard. After distribution of the packets, field-workers spent time in the buildings to encourage participation, provide additional copies of the study materials, and answer questions. The days and times of these outreach activities were varied to maximize the numbers and types of persons encountered. Posters advertising the study were placed in and around the buildings. Further publicity about the study was generated through notices in local newspapers and building newsletters, as well as by staff in attendance at meetings of community boards and tenant organizations and local health fairs. To estimate potential selection bias, we selected one building in the affected area (440 apartments) and two buildings in the control area (240 apartments) to receive additional outreach. These intensive outreach activities included additional mailings, advertisements, and time spent in the buildings by field-workers.

#### Outcome definitions

Health outcomes were defined on the basis of reported respiratory symptoms, unplanned medical visits, physician diagnoses, medication use, respiratory functional limitation, and

the time period in which symptoms occurred. "New-onset" symptoms were defined as upper respiratory symptoms that began after 9/11. A "persistent new-onset" symptom was a new-onset symptom that had bothered the respondent "some" or "a lot" in the 4 weeks prior to completing the survey.

### Statistical analysis

Because of variations in the number of persons residing in each apartment and the lack of information about the number of persons in nonresponding households, the response rate was calculated using the number of responding households as a numerator. Packets that were returned marked "vacant" were omitted from this calculation.

The demographic characteristics of participants in the affected and control areas were compared using the  $\chi^2$  test. For new-onset respiratory health outcomes, we computed cumulative incidence by dividing the number of participants with a new-onset outcome after 9/11 by the total number of participants. However, the denominators for unplanned medical visits, new diagnoses of asthma, and medication use were based on the subgroup of participants who were "previously healthy" (i.e., free of a physician's diagnosis of asthma, emphysema, chronic obstructive pulmonary disease, and chronic bronchitis prior to 9/11). Cumulative incidence ratios (CIRs) comparing the affected and control areas were computed, and 95 percent confidence intervals were used to estimate the precision of the CIRs. For respiratory functional status (before and after 9/11), prevalence rates (the number of persons in a disease status category divided by the total number of participants in each area) and prevalence ratios and their 95 percent confidence intervals were computed. Finally, the  $\chi^2$  test was used to compare data for the self-described breathing statements.

Unconditional logistic regression analysis was used to compute adjusted odds ratios while controlling for potential confounders, including age, gender, education, race, and smoking. Education was used as a surrogate for socioeconomic status, because information about education was more complete (11 percent missing data) than information for income (25.3 percent missing data), and education and income were highly correlated. Because respiratory diseases are not rare events, adjusted odds ratios from logistic regression tend to consistently overestimate the CIRs. Therefore, the crude CIRs and 95 percent confidence intervals are presented in the tables, and adjusted results were used only to determine whether the results were still statistically significant after controlling for confounders.

### RESULTS

A total of 9,168 survey packets were sent to residences in the affected area, and 962 packets were sent to residences in the control area. After exclusion of apartments that were definitely vacant, household response rates were 22.3 percent in the affected area and 23.3 percent in the control area. Among the buildings targeted for increased outreach, the response rates were 43.8 percent and 40.3 percent in the affected and control areas, respectively. A total of 553 respondents (17.3 percent) were excluded from the analysis on

**TABLE 1. Demographic characteristics (%) of residents of the affected area ( $n = 2,362$ ) and the control area ( $n = 291$ ), World Trade Center Health Survey, New York City, 2002**

Characteristic	Affected area	Control area	<i>p</i> value ( $\chi^2$ test)
Gender			0.35
Male	38.0	41.0	
Female	62.0	59.0	
Age (years)			<0.0001
0–34	23.4	23.8	
35–64	51.0	35.3	
≥65	25.6	40.9	
Annual household income			<0.0001
<\$24,999	34.7	19.9	
\$25,000–\$49,999	18.8	19.9	
\$50,000–\$99,999	23.6	30.5	
≥\$100,000	22.9	29.6	
Race/ethnicity*			
Hispanic	14.1	7.6	0.003
Asian	16.3	3.3	<0.0001
African-American	8.4	11.6	0.08
White	61.0	79.4	<0.0001
Other	4.8	4.7	0.95
Education			0.0002
Not a high school graduate	20.3	11.0	

\* Race/ethnicity groups were not mutually exclusive; therefore, percentages do not add up to 100%. For calculation of *p* values, instead of an overall  $\chi^2$  test, paired  $\chi^2$  tests were performed for each race/ethnicity group versus the other groups combined.

the basis of the four criteria described in Materials and Methods, giving us a total of 2,362 participants in the affected area and 291 in the control area.

Although we attempted to make the residents of affected and control areas demographically comparable, differences remained. The affected area had distributions of age and household income that were significantly different from those of the comparison area (table 1). In paired  $\chi^2$  tests, there were significantly higher proportions of Hispanics, Asians, and residents with less education (i.e., not high school graduates) but lower proportions of African Americans and Caucasians from the affected area as compared with the control area. In general, these demographic differences are similar to differences in the underlying populations according to 2000 US Census data. Since low socioeconomic status is associated with asthma, these variables were considered potential confounders and were controlled for in the multivariate analyses.

Table 2 describes the relation between residence in the affected area and upper respiratory and irritation symptoms. Rates of all new-onset symptoms were significantly higher in the affected area after we controlled for potential confounders (CIRs were 3.00–4.23). Residents of the affected area reported a significantly higher rate of at least one of

**TABLE 2. Incidence of upper respiratory symptoms after September 1, 2001, and associated cumulative incidence ratios among residents of the affected area (*n* = 2,362) versus the control area (*n* = 291), World Trade Center Health Survey, New York City, 2002**

Symptom(s)	New-onset				New-onset persistent			
	No.	%	CIR*	95% CI*	No.	%	CIR	95% CI
Eye irritation or burning	1,143	52.9	3.22	2.45, 4.25†	501	21.2	3.43	2.18, 5.40†
Nose irritation or burning	896	41.3	4.23	2.92, 6.11†	432	18.3	3.80	2.26, 6.38†
Nasal congestion	864	40.7	3.12	2.26, 4.31†	486	20.6	4.28	2.55, 7.17†
Hoarse throat or other throat irritation	1,142	53.1	3.41	2.56, 4.55†	543	23.0	3.34	2.18, 5.14†
Sinus congestion	719	34.2	3.11	2.18, 4.44†	425	18.0	4.76	2.65, 8.55†
Nose bleeding	310	13.7	3.47	1.92, 6.24†	101	4.3	2.49	1.02, 6.06
Recurring headaches	720	33.3	3.00	2.12, 4.26†	449	19.0	5.03	2.80, 9.03†
One or more of the above symptoms	1,696	71.8	2.22	1.88, 2.63†	1,031	43.7	3.02	2.28, 4.02†

\* CIR, cumulative incidence ratio; CI, confidence interval.

† The effect was still statistically significant (*p* < 0.05) after adjustment for age, gender, education, race, and smoking.

these new-onset symptoms (71.8 percent) than did controls (32.3 percent), an increase of 121 percent (CIR = 2.22, 95 percent confidence interval (CI): 1.88, 2.63). Furthermore, the persistence of these new-onset symptoms was significantly higher in the affected area. CIRs ranged from 2.49 to 5.03, with the highest CIRs being for congestion symptoms and recurring headaches. Affected-area residents also reported a significantly higher incidence of at least one persistent new-onset symptom (43.7 percent) than did controls (14.4 percent)—a 200 percent elevation (CIR = 3.02, 95 percent CI: 2.28, 4.02).

Data on medical visits and medication use after 9/11 among previously healthy participants are presented in table 3. The incidence of unplanned medical visits for respiratory problems was significantly increased in the affected area (14.5 percent) over the control area (8.4 percent; CIR = 1.73, 95 percent CI: 1.13, 2.64) after we controlled for potential confounders. A significantly higher proportion of affected-area residents started using respiratory medication after 9/11 (18.0 percent) in comparison with controls (6.2 percent)

(CIR = 2.89, 95 percent CI: 1.75, 4.76). By examining medication use in the past 4 weeks as an indication of disease persistence, we found that affected-area residents reported significantly higher rates (15.1 percent) than controls (6.2 percent) (prevalence ratio = 2.44, 95 percent CI: 1.48, 4.02). In particular, use of fast-relief (9.7 percent) and controller (10.4 percent) asthma medications was significantly higher in the affected area. The rates of new diagnosis of asthma and use of more medication after 9/11 were not statistically significantly different between two areas.

We examined three indicators characterizing different degrees of shortness of breath with exertion before and after 9/11 (table 4). Before 9/11, data for all three indicators were similar in the two areas. However, after 9/11, these indicators pointed to greater increases in the degree of shortness of breath in the affected area (prevalence ratios were 1.51–1.83). When the participants were asked to describe their breathing in the past 4 weeks (data not shown), approximately 16 percent of respondents in the affected area reported that they had “regular trouble with breathing, but it always got

**TABLE 3. Incidence of medical consultations, asthma diagnoses, and use of respiratory medication after September 11, 2001, among previously healthy\* residents of the affected area (*n* = 2,362) versus the control area (*n* = 291), World Trade Center Health Survey, New York City, 2002**

	Affected area		Control area		Cumulative incidence ratio	95% confidence interval
	No.	%	No.	%		
Unplanned medical visit(s) for respiratory problems in past 12 months	286	14.5	21	8.4	1.73	1.13, 2.64†
Physician diagnosis of asthma after September 11	101	18.0	6	12.0	1.50	0.69, 3.24
Started using respiratory medication after September 11	340	18.0	15	6.2	2.89	1.75, 4.76†
Used more respiratory medication after September 11	62	3.3	3	1.3	2.64	0.83, 8.34
Used respiratory medication in past 4 weeks	285	15.1	15	6.2	2.44	1.48, 4.02†
Used fast-relief‡ asthma medicine in past 4 weeks	178	9.7	9	3.8	2.55	1.32, 4.91†
Used controller§ asthma medication in past 4 weeks	191	10.4	10	4.3	2.44	1.31, 4.55†

\* No diagnosis of asthma, chronic obstructive pulmonary disease, chronic bronchitis, or other lung disease before September 11, 2001.

† The effect was still statistically significant (*p* < 0.05) after adjustment for age, gender, education, race, and smoking.

‡ Asthma medication that induces rapid bronchodilation of the airways.

§ Asthma medication that can either prevent inflammation or maintain bronchodilation.

**TABLE 4.** Self-reported prevalence of shortness of breath with varying levels of exertion before and after September 11, 2001, among residents of the affected area ( $n = 2,362$ ) versus the control area ( $n = 291$ ), World Trade Center Health Survey, New York City, 2002

Level of exertion	Affected area		Control area		Prevalence ratio	95% confidence interval
	No.	%	No.	%		
Shortness of breath when hurrying on level ground or walking up a slight hill						
Before September 11	541	26.1	61	24.0	1.09	0.86, 1.37
After September 11	1,075	53.8	71	32.0	1.68	1.38, 2.05*
Shortness of breath when walking with other people of one's own age on level ground						
Before September 11	325	15.9	38	14.8	1.08	0.79, 1.47
After September 11	730	38.6	47	21.1	1.83	1.41, 2.38*
Having to stop for breath when walking at one's own pace on level ground						
Before September 11	303	14.4	39	15.1	0.95	0.70, 1.30
After September 11	653	32.9	50	21.7	1.51	1.18, 1.95*

\* The effect was still statistically significant ( $p < 0.05$ ) after adjustment for age, gender, education, race, and smoking.

completely better" as compared with 10 percent in the control area ( $p < 0.05$ ). Furthermore, significantly more residents of the affected area reported that their "breathing was never quite right" (21 percent) as compared with residents of the control area (9 percent) ( $p < 0.05$ ).

## DISCUSSION

### Respiratory outcomes

In the current study, we found that incidence rates of at least one new-onset upper respiratory symptom and all individual symptoms were significantly increased by 122 percent and over 200 percent, respectively, among affected-area residents. Additionally, almost half of residents in the affected area reported persistence of these symptoms, and the rate of persistent new-onset symptoms was increased by 200 percent. Prezant et al. (10) reported that among firefighters with high or moderate levels of exposure, 54 percent had nasal congestion and 41 percent had nasal drip after 9/11. Eighty-two percent of the firefighters who had high levels of exposure experienced sore throat after 9/11. Banauch et al. (11) reported persistence of symptoms and bronchial hyperactivity among these firefighters 6 months after 9/11.

Among previously healthy residents in the affected area, we found a 73 percent increase in unplanned medical visits and a 189 percent increase in new medication use for respiratory problems after 9/11. Moreover, there was a 144 percent increase in the use of respiratory medication in the past 4 weeks, including use of fast-relief and controller medicines, among previously healthy affected-area residents. Additionally, the self-described respiratory functional status of affected-area residents was impacted more than that of control-area residents. Shortness of breath with varying levels of exertion was significantly higher in affected-area residents than in the controls. Self-reported descriptions of breathing during the past 4 weeks also indicated significantly higher levels of breathing trouble in the affected area.

Szema et al. (5) found that visits to a health clinic for asthma and prescriptions for asthma medication both increased among pediatric asthma patients after 9/11. All of these findings suggest that residents near Ground Zero experienced a significant increase in respiratory diseases related to the WTC disaster and that these symptoms were still persistent in a significant portion of the residents after 1 year.

Our study was one of the earliest of the few studies to estimate the incidence of respiratory disease among residents of Lower Manhattan after 9/11. Both Fagan et al. (4) and Szema et al. (5) studied residents of Lower Manhattan; however, their populations were restricted to persons with asthma. Although residents near Ground Zero were probably not exposed to air pollution levels as high as those of the firefighters involved in WTC rescue, recovery, and clean-up activities, we have shown that residents of the affected area did report significantly more upper respiratory symptoms than residents of the control area.

### Ambient air quality after 9/11

The New York City Department of Health and Mental Hygiene (12) measured the levels and composition of outdoor and indoor surface and airborne dust from November 4 to December 11, 2001, in residential areas near Ground Zero and in a comparison area. That study found a greater percentage of synthetic vitreous fibers, asbestos, quartz, calcite, portlandite, and gypsum in settled dust in Lower Manhattan than in the comparison area. The Environmental Protection Agency collected dust samples at various locations in the immediate vicinity of the WTC site 1–2 days after 9/11 (2). The WTC samples of particulate matter less than 2.5  $\mu\text{m}$  in diameter were alkaline and composed primarily of calcium-based compounds such as calcium sulfate (gypsum) and calcium carbonate (calcite). Gypsum and calcite can irritate the mucus membranes of the eyes, nose, throat, and upper airways (13), and calcium carbonate dust can cause coughing, sneezing, and nasal irritation (14).

Although smoke or debris might have contributed to the increase in adverse respiratory health outcomes in this study, psychological stress might also have played an important role in these effects (15). In the current study, we could not determine whether environmental factors, psychological distress, or both contributed to the increase in respiratory symptoms, since psychological factors were not examined.

### Strengths and limitations

This study is an important first step in identifying the acute and chronic respiratory health impact of the WTC disaster. Of the few studies that have investigated respiratory health among residents of Lower Manhattan after 9/11, it is one of the largest. This study responded to local residents by examining specific symptoms of concern to the community. The design and analysis used in this study allowed for the control for seasonal and socioeconomic confounding effects. In addition, the use of a cohort design allowed for examination of multiple health outcomes.

Although intensive outreach activities were implemented as described in Materials and Methods, we obtained low response rates. This may have been due to the emotional aftermath of the disaster—residents might not have been willing to answer questions that would provoke an emotional reaction. In addition, at the time of this study, the residents of Lower Manhattan were inundated with forms from government agencies and other organizations. The amount of information requested during this time was probably overwhelming. In addition, residents may have thought they had already completed a questionnaire when in fact they had not. New York City also has a history of lower response rates. The 2000 Census only recorded a final response rate of 55 percent in New York City, despite intense advertising and door-to-door follow-up. More importantly, a significant number of residents moved out of the affected area after 9/11. For this reason, if the denominator for calculating the household response rate was overestimated (despite attempts to identify vacant households), the actual response rate would have been underestimated.

The low response rates, although similar between the two study areas, may have introduced selection bias. That is, residents who experienced symptoms, especially those who lived in the affected area, might have been more likely to participate than those who did not. This could have caused the incidence of new-onset symptoms to be overestimated, particularly in the affected area. To minimize this bias, we emphasized the importance of participation for people with and without breathing problems during recruitment activities. In addition, general terms such as “breathing or lung problems” rather than specific terms like “asthma” were used.

To examine possible selection bias due to low response rates, we compared results for the buildings targeted for increased outreach and the nontargeted buildings. Results from the targeted buildings, in which higher response rates were achieved, are assumed to be more accurate and representative. If there was selection bias, we would expect to find a weaker exposure-disease association in the targeted buildings. Instead, we found that the risk estimates for new-onset and new-onset persistent symptoms were consistently higher in

the targeted buildings than in the nontargeted buildings (see appendix table 1). These results suggest that any selection bias was in the opposite direction than we would have expected (i.e., the true association may have been underestimated).

Another potential problem with this study is reporting bias. Affected-area participants may have recalled or reported more symptoms than the controls. To prevent such reporting bias, we asked symptom questions not only qualitatively but also quantitatively, by including questions on specific time frames, severity, and frequency, which are less prone to recall bias. To estimate potential reporting bias, we compared rates of self-reported physical disability (which should not have been related to WTC exposures) between the affected area and the control area. The similar rates in the two areas (14.7 percent and 13.1 percent, respectively) indicate no significant reporting bias due to residence area. A participant responding affirmatively about every symptom may have been affected by recall bias ( $n = 10$ ). Minimal changes were observed when these persons were excluded from the analysis. We believe recall of unplanned medical visits, including emergency department visits and hospitalizations, is more likely to be accurate than recall of symptoms, since such events are more likely to be memorable, and we solicited information on the reason for and exact month and year of the visit. Among respondents reporting a specific respiratory symptom, we compared the proportions who had unplanned medical visits. We found that the proportions were similar in the affected and control areas for most symptoms. If there was overreporting in the affected area, the proportion of persons reporting a specific symptom who also had unplanned medical visits should have been lower in the affected area than in the control area. Therefore, there is no clear evidence of reporting bias on the basis of our limited assessment. In general, reporting bias can be minimized by using objective indicators (e.g., medical records) rather than self-reported information. In this study, it was not feasible to review medical records. Additionally, an analysis of medical records would probably have underestimated or completely missed the less severe symptoms included in our survey.

One final area of concern is the possibility of exposure misclassification. As described above, we excluded persons with evidence of residential mobility and exposures unrelated to their area of residence in order to minimize this bias. However, an unidentified group of affected-area residents may have altered their behavior, spending less time at home in the aftermath of 9/11. Thus, their actual exposure may have been overestimated. On the other hand, it is also possible that control-area residents were impacted by the WTC plume in unforeseen ways.

### Conclusion

This study suggests that residents who lived near Ground Zero on 9/11 reported significantly more upper respiratory and irritation symptoms, unplanned medical visits, and use of respiratory medications and decreased respiratory functional status after 9/11. In a significant portion of the residents, these symptoms persisted 1 year after 9/11. Although we cannot rule out the possibility that selection and

reporting bias may have contributed to these increases, chemical analyses of WTC-related pollutants by other researchers support the biologic plausibility of these findings. Further analyses are needed to examine whether increases in reported respiratory disease can be related to differences in exposure and to monitor the potential long-term health effects of the 9/11 disaster in this population.

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**APPENDIX TABLE 1. Incidence of new-onset and persistent new-onset upper respiratory symptoms after September 11, 2001, among residents of the affected area versus the control area, by level of outreach (targeted areas and nontargeted areas), World Trade Center Health Survey, New York City, 2002**

Symptom(s)	New-onset symptoms				Persistent new-onset symptoms			
	Targeted area		Nontargeted area		Targeted area		Nontargeted area	
	CIR*	95% CI*	CIR	95% CI	CIR	95% CI	CIR	95% CI
Eye irritation or burning	4.50	2.72, 7.45	2.76	1.99, 3.85	4.28	2.02, 9.10	3.22	1.81, 5.74
Nose irritation or burning	8.96	4.07, 19.73	3.19	2.11, 4.83	5.68	2.33, 13.82	3.35	1.76, 6.37
Nasal congestion	5.47	2.89, 10.38	2.50	1.72, 3.62	9.24	3.45, 24.69	3.32	1.81, 6.09
Hoarse throat or other throat irritation	4.62	2.81, 7.61	3.06	2.15, 4.36	4.22	2.19, 8.15	3.42	1.92, 6.08
Sinus congestion	6.42	3.09, 13.35	2.40	1.61, 3.59	6.53	2.70, 15.82	4.83	2.19, 10.65
Nose bleeding	10.56	2.60, 42.89	2.41	1.26, 4.59	5.09	1.20, 21.47	2.18	0.69, 6.81
Recurring headaches	5.19	2.73, 9.89	2.48	1.64, 3.75	8.16	3.04, 21.91	4.41	2.12, 9.16
One or more of the above symptoms	3.46	2.49, 4.82	1.83	1.51, 2.21	3.69	2.37, 5.74	3.01	2.07, 4.37

\* CIR, cumulative incidence ratio; CI, confidence interval.

# **Attachment 9**



# **NEW YORK MAGAZINE**

## **The City Politic**

### ***Zero for Heroes***

**Many of the people who spent months in the pit at ground zero have respiratory ailments. And no health insurance. And no aid from the government. Why?**

**October 20th, 2003**

**By Greg Sargent**

David Rapp used to pride himself on being an active guy. A 250-pound construction worker, he drove piles on the Williamsburg Bridge and on projects all over the city. He could carry a sack of cement on his shoulder as easily as you carry an order of takeout sushi back to your desk. He liked fixing cars. He went crabbing in Jamaica Bay.

Then came September 11. Rapp spent several months at ground zero, drilling steel reinforcements into the "bathtub wall"-the slurry wall between the pit and the Hudson River that prevented the water from flooding the area.

Rapp's illness began with a faint dizziness and shortness of breath, but it steadily got worse. Before long, he was useless to his former employers. They laid him off. Now Rapp is very, very sick. He's suffering from severe pulmonary disease-meaning he never gets enough air. He has frequent respiratory infections. He's on twelve medicines. He carries an oxygen tank wherever he goes. "I just went straight down," Rapp says, his voice somewhere between a whisper and a rasp. "It's real depressing."

He's learning to accept the fact that he may never work again. But with that comes a question: How is Rapp, whose medical costs are now covered by temporary state workers' comp, going to pay for his treatment in the future?

"I'm a scared guy right now," says Rapp, who clearly isn't accustomed to making such an admission. "I'm in real bad trouble. There are a lot of claims coming in right now. I'm afraid my pharmacy will tell me I'm cut off. I rely on my medicine to breathe."

Rapp is one of perhaps thousands of people who are not cops or firefighters but who toiled at ground zero and are now sick, even disabled, from asthma, chronic infections, and other respiratory illnesses. These conditions, some experts maintain, were caused by the "crud"-the mixture of dust, ash, fumes from burning plastic, pulverized concrete, and vaporized human remains around ground zero.

Unlike the cops and firefighters whose heroism-and subsequent illnesses-have gotten huge amounts of attention, these other workers lack the medical safety

net and pension enjoyed by the guys in uniforms. So they are scrambling for treatment in all kinds of ways. Some are on waiting lists for financially strapped private programs. Others are still battling for workers' comp. Still others are defying doctors' orders and working-because with a job comes health insurance. While some have found temporary treatment, they all share an uncertain future, with no guarantee that they'll get the long-term care they'll need.

"Thousands of people are facing lives turned upside down by illness-without access to care."

The reason for this is not hard to divine. Two years have passed since the attacks, and there has been no comprehensive effort by the federal government to treat people who got sick helping out at ground zero. Incredibly, thousands of people are ill from a national disaster, and the federal government is AWOL.

"From a public-health standpoint, this is an intolerable outrage," says Dr. Stephen Levin, who oversees a program at Mount Sinai Hospital that screens thousands of patients with ground-zero-related illnesses. "There is a patchwork, at best, of treatment resources for a limited number of people. But this requires a serious federal response. Hundreds and hundreds of people are facing lives turned totally upside down by illness-without access to care."

They include volunteers with no insurance; people whose workers'-comp claims have been stymied by insurance companies; and others who were laid off after 9/11 because they were too sick to work-and lost their insurance. These are the same people, you may recall, who were hailed as heroes after 9/11, with adulatory bumper stickers and THANK YOU signs along the West Side Highway.

What made them ill? There was the hydrochloric-acid mist released by plastics smoldering in the wreckage. Also, the falling towers ground a huge amount of concrete into powder so fine that it could be inhaled deep into the lungs. These irritants caused swelling that led to sinusitis, laryngitis, bronchitis, asthma.

Marvin Bethea developed bad asthma. When the towers fell, Bethea, a paramedic, was tending to people in a nearby bank. He found himself inhaling air so dense, he recalls, that "it felt like someone was dumping dirt down my throat." Two years later, his doctor has told him his condition is so bad that he should quit his job, which entails running up stairs with heavy equipment. But he's still working-because without the job, he'd lose the health insurance.

The plight of these workers has been taken up by politicians here and there, notably Hillary Clinton and Representative Carolyn Maloney. Maloney is drafting legislation that would require the government to pay the medical costs of all responders without coverage who were injured or sickened at ground zero.

"Three thousand rescue workers, and probably thousands more, are still

suffering from health problems that are a direct result of their work at ground zero," she says.

In recent weeks, Levin has done an extensive assessment of his program, which has screened nearly 8,000 victims. And he made two striking discoveries. The first: Ground-zero workers who are being examined now are showing roughly the same rates of illness as they did last year. "We're finding that these problems are not going away," Levin says.

The second revelation is no less surprising. Mount Sinai also runs a treatment outfit that has cared for around 400 people. And of those patients, Levin says, 40 percent have no insurance whatsoever. "This disturbing new finding further illustrates how our fragmented system fails people every day," says Clinton.

The environmental fallout of 9/11 has finally enabled Democrats to stake out a ground-zero-related issue of their own. Clinton has already made headlines with her criticism of the EPA and its mishandling of the downtown-air-quality issue.

In fairness, the Feds have done a few things. Last February, under heavy pressure, they allotted \$90 million to pay for the long-term monitoring of ground-zero workers. But the program covers only screening-not treatment. There's a federal Victims Compensation Fund, but it only applies to people who were at ground zero between September 11 and 15.

In the weeks ahead, the government will have a harder time sidestepping the issue. Representative Chris Shays, a Connecticut Republican, is chairing a congressional hearing at Mount Sinai on October 28 on ground-zero-related health issues. It promises to be a lively show, at which Rapp will be a star witness. "We'd like to see the administration come to grips with this problem," says Levin. "They surely haven't done so thus far."

# **Attachment 10**

Hello, my name is \_\_\_\_\_. We are collecting emergency-related health information, this information is important to us and affected people. May I read you a consent statement, and then ask you some health questions? We are getting information from people exposed to this event so they can receive information about exposures, health, or services. You also may be contacted at a later date to see if you want to join a health study. You are free to enroll in the Registry or not. If you choose to enroll, we will ask you questions that will take about 5-10 minutes. You can choose not to answer any question you wish. All the information will be kept confidential to the extent allowed by law.

99 ☐ Refuse to Answer

► SKIP TO QUESTION 22

**18. What is that person's full name?**FIRST LAST  M. I. **19. What is (his/her) home address?**STREET CITY  STATE  ZIP 98 ☐ Don't Know99 ☐ Refuse to Answer**20. What is (his/her)****A. Home telephone number?** (  )  - 96 ☐ None 98 ☐ Don't Know 99 ☐ Refuse to Answer**B. Work telephone number?** (  )  - 96 ☐ None 98 ☐ Don't Know 99 ☐ Refuse to Answer**C. Cell/other phone number?** (  )  - 96 ☐ None 97 ☐ Same as Home Phone98 ☐ Don't Know 99 ☐ Refuse to Answer**21. Does (he/she) have an email address?**1 ☐ Yes, SPECIFY: 2 ☐ No98 ☐ Don't Know99 ☐ Refuse to Answer**EXPOSURE INFORMATION****Now I'm going to ask you just a few questions about (your/registrant's) experience with this event.****22. (Were you/was registrant) exposed to this event as (CHECK ALL THAT APPLY) :**1 ☐ A resident2 ☐ A passerby3 ☐ An employee4 ☐ A responder or rescue worker5 ☐ A government official6 ☐ A clean-up worker7 ☐ An non-governmental organization/site volunteer98 ☐ Don't Know99 ☐ Refuse to Answer**23. (Were you/was registrant) at the event site when the event started?**1 ☐ Yes2 ☐ No98 ☐ Don't Know99 ☐ Refuse to Answer**24. At the start of the event on [DATE] at [TIME], at what address (were you/was registrant)?**98 ☐ Don't Know99 ☐ Refuse to Answer**25. What was the name of nearest building to (you/registrant)?**98 ☐ Don't Know99 ☐ Refuse to Answer**26. What was the nearest intersection?**98 ☐ Don't Know99 ☐ Refuse to Answer**27. What was the nearest landmark?**98 ☐ Don't Know99 ☐ Refuse to Answer**28. At the start of the event, (were you/was registrant) (CHECK ALL THAT APPLY):**1 ☐ Inside a building or structure2 ☐ Inside a car or other vehicle3 ☐ Outside4 ☐ At some other location, SPECIFY: 98 ☐ Don't Know99 ☐ Refuse to Answer**29. As a result of the event, did (you/registrant) get injured or ill?**1 ☐ Yes, DESCRIBE: 2 ☐ No98 ☐ Don't Know99 ☐ Refuse to Answer**30. Before the event, did (you/registrant) have any of the following conditions? (CHECK ALL THAT APPLY)**1 ☐ Chronic illness2 ☐ Physical disability3 ☐ Other disability4 ☐ None98 ☐ Don't Know99 ☐ Refuse to Answer

] ► SKIP TO QUESTION 32

**31. Please describe your condition:****32. IF REGISTRANT IS FEMALE LESS THAN 12 YEARS OLD OR MALE, SKIP TO QUESTION 33. OTHERWISE ASK: (Are you/is registrant) pregnant?**1 ☐ Yes2 ☐ No98 ☐ Don't Know99 ☐ Refuse to Answer**33. As a result of this event, (are you/is registrant) personally in need of any of the following? (CHECK ALL THAT APPLY):**1 ☐ Medications/supplies2 ☐ Medical care3 ☐ Water4 ☐ Food5 ☐ Shelter6 ☐ Utilities7 ☐ Other, SPECIFY: 8 ☐ None98 ☐ Don't Know99 ☐ Refuse to Answer**34. Which best describes the level of health insurance (you have/registrant has)?**1 ☐ Full or comprehensive2 ☐ Partial or limited3 ☐ None98 ☐ Don't Know99 ☐ Refuse to Answer

] ► SKIP TO QUESTION 36

**35. Please give me the name of your health insurance plan.****36. Event-specific question 1.**1 ☐ Response Option 12 ☐ Response Option 23 ☐ Response Option 34 ☐ Response Option 45 ☐ Response Option 56 ☐ Response Option 698 ☐ Don't Know99 ☐ Refuse to Answer**37. Event-specific question 2.**1 ☐ Response Option 12 ☐ Response Option 23 ☐ Response Option 34 ☐ Response Option 45 ☐ Response Option 56 ☐ Response Option 698 ☐ Don't Know99 ☐ Refuse to Answer**That completes our interview. Thank you very much for your time.****TO BE COMPLETED BY INTERVIEWER****38. INDICATE THE SEVERITY OF THE EFFECT ON REGISTRANT**1 ☐ No Obvious Effect2 ☐ Affected, Ambulatory3 ☐ Unconscious, Non-Ambulatory, Or Badly Injured/III4 ☐ Dead5 ☐ Not Applicable98 ☐ Don't Know